The Builder.

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THE Ministry having returned to office, Lord Seymour's Metropolitan Buildings Bill will be proceeded with. As might be expected, it excites considerable interest within the limits to which it refers. Several important bodies have appointed committees to consider it,—the Institute of Architects, the Builders' Society, the Master Carpenters' Society, the Metropolitan Sanitary Association, &c.; and it is to be hoped that Lord Seymour will postpone the second reading to give them time to make their respective reports. Our readers are already in possession of the heads of the Bill,* and we now propose to examine it more in detail, and to suggest such alterations in it as seem to us desirable.

Having long ago urged that the referees should sit in open court (as police magistrates), and give prompt decision in ordinary cases, we view with satisfaction those clauses of the Bill which provide for the establishment of such a Court. Since the publication of our brief analysis of the Bill, we have received many communications on the subject from general practitioners, district surveyors, and builders, and all, without exception, express the same opinion on this head. This provision alone has, in truth, secured for the proposed measure a much greater degree of favour than was awarded to previous proposals. The constitution of the Court is another question; and upon this the majority of our correspondents agree with us in thinking that, as ninety-nine out of a hundred questions which are likely to arise, will have reference to facts connected with building operations, these would be better determined, in the first instance, by an architect than a lawyer, and that it would be found more convenient to impose the duty of hearing upon the architect, constituting him the judge, and giving him the assistance of a lawyer, to draw his awards and advise on points of law, when they arise. In the analogous case of an ordinary arbitration connected with building matters, this is the course most frequently pursued; and our experience goes to show that an architect always decides the questions referred to him in one-half the time, and at one-half the expense that a lawyer would.†

Those who drew the Bill seem scarcely to be aware of what a large amount of unrecognised labour, involving duty of a most invidious character, will devolve upon the architectural referee, who is introduced (clause 16) with a *whereas the questions arising* [in a Building Bill!] MAY BE of *a technical nature!* Why what are the questions—nine out of ten—that do arise? He is to *advise* the said judge, who, if he is a wise man, will act upon the advice given, and the architectural referee will be an irresponsible despot; and if he is a fool (that is, the judge) he will affect an opinion of his own, and the architectural referee will *enjoy* universal abuse, as the judge's reputed adviser and supposed suggester of his judgment!

By sections 80 and 81 of the new Bill the architectural referee will have the power of controlling the mode of construction to be adopted in *all* the public buildings of London: this, in the hands of a capricious or incapable person, would be a very dangerous power. Perhaps it would be desirable to provide in the Bill for the appointment of two assistant architectural referees, who, in the event of any difference between the principal architectural referee and the person employed to design the building, might act as a court of appeal, or on any very important occasion might be called in in the first instance to assist the court with their judgment. A salary would not be necessary, for it would be a distinction to hold the appointment, and they might be paid by a fee when their services were required. As it now stands the practice, as it regards construction, of all architects and builders within the metropolitan district, will be under the autocratic authority of the architectural referee, to whom Providence grant good discretion and a tough hide!

The power proposed to be given to the judge is very great,—greater than it should be. By clause 37 he may *rehear* any cases, "whenever the ends of justice or the objects of the Act would, in his opinion, be promoted by so doing," and may rescind or alter any order that may have been made previously by him. This would leave suitors in great uncertainty, and should be modified, at all events, to the extent of limiting the time within which the rehearing might take place.

Clause 38, which gives the judge power, with consent of all parties, to refer matters to arbitration, gives the appointment of the arbitrator to the judge, and, moreover, which seems to us very objectionable, empowers him, "on application to him (*query*, by whom?) within such time as shall be limited by the rules of practice," *to set aside the award!*

No appeal can be made against any judgment or order of the judge, except on a special case drawn up by the judge himself.

As to the costs of the court, nothing is settled. These would require looking after.

Relative to notices, a great improvement is proposed. The Bill provides that all forms and notices are to be prepared by the judge, as from time to time they become necessary, and that the notices emanating from the Metropolitan Buildings Office are to be served by the bailiff of the court. Great inconvenience (from which we have often personally suffered) has arisen by the present arrangement, which compels the parties carrying on proceedings to use the notices scheduled to the Act, though they are sometimes quite inapplicable, and not only to prove the service of their own notices, but also to do the like by all the documents coming from the Metropolitan Buildings Office.

Clause 29 is very objectionable, and should be expunged.* It would be most unjust to compel suitors to employ a solicitor in every case, when his architect, who would probably be forced to appear, could usually manage the matter for him much better. It is no answer to say, that by permission of the judge a person not an attorney may appear: all must know very well that in practice the clause would amount to a prohibition of such a course, and that it is intended to do so is made evident by the provision that no person but an attorney can recover costs for so appearing. We trust that determined opposition will be offered to this clause on all hands.

Throughout the Bill, the abnegation of the rights of the architectural profession is apparent.

In comparing the new Bill with the Act now in operation, with regard to the *schedules*, it seems to show great and radical improvement. The distinction between the first and second class buildings, which has been the cause of much difficulty, is abolished, and all those parts of the schedules connected with this distinction, and with the thicknesses of the walls, have been proportionably simplified. There is also a considerable extension in the area of the first-rate house (as we mentioned in our first notice), and an extension also of half a square in the area of the fourth-rate house; both which alterations will be found of great advantage to the builders and the public. In the latter case we should be glad to have it still further extended: the previous restriction has had a very injurious effect in a sanitary point of view.

Again, the party and external walls are made uniform in thickness, which will be found convenient; and it seems (although we reserve our opinion on this head) that generally the schedules, while they embody the modifications which have been found necessary from time to time, are, upon the whole, both shortened and simplified.

Some alterations will be required in the party-wall sections of the Bill, for, as they now stand, it is not at all clear how or by whom walls are to be surveyed, in case of difference between the building-owner and adjoining-owner, which usually occurs.

The table of fees is now so framed, that, by the general rules which accompany them, an end will be put to those accumulations of charges which have sometimes been made for different works executing in the same buildings at the same time, and which have brought so much scandal on the district surveyors. By the introduction, in table 2, of the words "not exceeding," it will be manifest, both to the public and to the surveyors, that these are to be considered *maximum* charges, and to be allowed only where the *quantum* of work done will justify their being made.

Throughout the Bill, considerable discretionary powers are given to the district surveyor, who will be able to decide at once what in each particular case is to be done, instead of sending the builder, as heretofore, to the official referees upon every trifling departure from the strict letter of the Act, which may become necessary. Thus, the partial rebuilding of irregular buildings for the purpose of public improvements; the raising of existing walls, sound but not of the required thickness; the materials to be used for projections from external walls; the formation of recesses in party-walls; and the erection of buildings on

* See page 131, *ante*.

† An intelligent builder, writing to us on the subject, says:—"Let there be a law judge, if they like,—but let all questions affecting construction or the skill and knowledge of an architect be sent to the architectural referees (three instead of one), and make it a point that their opinion be adopted, instead of the judge having the veto upon things he knows nothing about."

* "No person shall be entitled to appear for any other party to any proceeding in the said court, unless he be an attorney of one of her Majesty's Superior Courts of Record, or a barrister-at-law instructed by such attorney on behalf of the party, or, by leave of the judge, any other person allowed by the judge to appear instead of such party; and no person, not being an attorney admitted to one of her Majesty's Superior Courts of Record, shall be entitled to recover any costs, fees, or sums of money for appearing or acting on behalf of any other person in the said court."

forecourts, beyond the general line, are all left to the discretion of the district surveyor.

We may mention that the surveyors appointed after the new Act comes into operation are to reside, or to have their principal place of business, each in his district. And this will bring us to the provision in the Bill quietly to transfer to the Office of Works the appointment, not only of the architectural referee and the assistant surveyor, but of all future district surveyors, and which gives them power to dismiss at pleasure any district surveyor, and to consolidate or alter the limits of districts, thus depriving the magistrates of the metropolitan districts of a privilege which they have long exercised. We cannot view this change favourably, and hope it will not be persisted in. It is true that, under the present arrangement, connection and influence will enable an inferior man (nevertheless qualified) to succeed in opposition to one with stronger claims on the public and better qualified for the office, but without friends. Still by dint of canvassing he *may*, perchance, ultimately succeed. Under the proposed arrangement, however, it is to be feared that the appointments would be confined wholly to a *clique*, and that men unconnected with the office would have no chance of success.

Centralization, without obviously great advantage, should be opposed.

Our readers will remember that an inquiry into the proceedings of the present Buildings Office was instituted some time since by the Office of Works. The gentlemen to whom this was confided were Mr. J. Mellor, barrister, and Mr. Joseph Gwilt, architect. Their report, on which, as we suppose, the present Bill was framed, has been printed for the House of Commons, and will soon be open to us, when we shall probably see the reasons which have influenced the proposed changes. We add two communications relative to the Bill, one from a general practitioner, and the second from a district surveyor, whose view of the proposed constitution of the Court is somewhat different from our own.

COMMUNICATIONS AS TO THE NEW METROPOLITAN BUILDINGS BILL.

THE new Bill to supersede the present Metropolitan Buildings Act, seems, speaking generally, well digested and drawn, and only requires correction and modification to make it, in my opinion, work well and beneficially for the public, and infinitely superior to the present Act, which is so complex and ambiguous that it constantly creates doubts, delay, annoyance, and unnecessary expense; and in some cases it is rendered wholly nugatory by the differences which arise between the architectural and legal Officers who have to adjudicate thereon. For instance: a doubt arises between two parties; the matter is referred to the official referees; the whole of the business is gone through before them and the registrar, and the award of the former is tendered to the latter to affix his seal: he differs on a point of law, and refuses to attach it: the matter is then sent to the Commissioners of Works and Buildings for their decision, and very often they confirm the view taken by the registrar: thus all the proceedings are upset at last, instead of at first, as they should have been. The Bill proposes that the Metropolitan Buildings Office should assimilate to a County Court, a judge (a barrister of seven years' standing) to preside, to determine, first, whether the subject-matter be within the jurisdiction of the law, and the preliminary proceedings be correct; and then to decide on the matter of fact, with the advice of the architectural referee: thus, to a great extent, illegal awards will be avoided, and the public will not be inconvenienced by unnecessary delay and useless expense as at present. *Vivâ voce* hearings in all petty cases: arbitration where necessary: trial by jury of five in case of easements or otherwise where required, and the opinion of the Superior Courts readily obtained by the judge if needed. Proper officers would be attached to the Court to afford information, and serve the necessary summonses, and parties aggrieved as to charges made for party structures, excessive fees, &c. could speedily obtain redress: all this, I am persuaded, would work well.

The schedules attached to the Act are more distinctly classified and are much more clearly defined and simplified than the present—the annoying distinction between the dwelling-house and warehouse classes would be abolished—the thickness of walls modified—the extent of the first and fourth rate houses very properly enlarged—a greater discretion would be given to the district surveyors, much, I should say, for the benefit of the public, by preventing frivolous references, and a still greater discretion would be given to the Commissioners of Works and Buildings by sec. 70, as to modifying the strict rules of the Act in special cases, and also generally, if requisite, to prevent undue injury, loss, and inconvenience to any parties concerned, and the fees of the District Surveyors would also be modified, inasmuch as the words "not exceeding" are inserted for certain works instead of a positive amount as at present.

All public buildings would be placed under the supervision of the architectural referee, and he would be bound to certify, if required, before the works proceed, whether they might or might not be carried out as proposed, instead of the present most objectionable practice of refusing to do so and reserving the right of objecting when the works are done.

Schedule K provides that all buildings *and their appendages* must be constructed *and maintained* in a safe and secure manner, not only in reference to *the public*, but to the inmates, which, as regards the latter, is an excess on the present law, therefore greater responsibility would be thrown on the architectural referee and district surveyors. The majority of the latter consider that such a responsibility with regard to public buildings would be too great for the small amount of fees which they would be entitled to; they therefore would willingly resign this supervision and the fees attached thereto to the architectural referee, who would be paid by salary in addition thereto, and therefore would be properly remunerated for this responsible duty. It is considered also that it would be better to refer these buildings to one person than to the district surveyors in their respective districts, as it would secure a uniformity of practice as to the necessary substantiability, &c. The only defect which is apparent in this portion of the Bill is, that a provision is not made for a ready appeal against the decision of the architectural referee to two other referees, or to the Commissioners of Works and Buildings, in case of his excising any arbitrary rule of practice.

As to the necessity for law being paramount, I will give an instance. I had a case where a stone pedestal to an area enclosure of one owner was alleged to be injurious, by the adjoining owner, to his house, inasmuch, *inter alia*, as it would be used as a urinal: the official referees decided in his favour. The registrar objected on a point of law, namely, that the person committing the nuisance would be the delinquent in the eye of the law, and not the pedestal, therefore the award was bad: and the whole of the proceedings, which occasioned much trouble, fell to the ground. * *

Lastly, I repeat that the Bill appears to me well drawn as a whole. I sat on Lord Morpeth's committee, the result of which was the proposed Bill of 1849; and also as a district surveyor upon all the committees connected with our association, and have given the matter most mature consideration; I therefore have not hastily arrived at this decision: there may be some things in the Bill upon which it may be unnecessary to legislate, but, as they are all more or less under the law at present, and have been put there by the Legislature, it is not for me to make any remark thereon; so I leave that matter in your hands, and subscribe myself, A DISTRICT SURVEYOR.

IT is evident that the attempt to supersede lawyers, and to establish a court of reference, will not be allowed to succeed in our law-loving and law-ridden country. After a trial of five or six years of our architectural court of reference under the present Act, it is found, or assumed, that it will not work pleasantly, and it may safely be inferred, without seeking for other causes, that the differences which have arisen upon the points of law between the official referees and the registrar have given ground for the proposed demolition of the present edifice, and for erecting on its ruins an architectural county court, corresponding in design with the courts which the reform movements in the law have lately forced into existence. Such is the result of the awful words, "*it is not strictly legal;*" and as these, to an English ear, suggest processes of endless vexation, from the bailiff's limbo to the hopeless Inferno of Chancery, we are all willing to submit to any infliction which the learned professors of law recommend, to avoid the chance of becoming acquainted therewith, and in hopes of obtaining uniformity of judgment and infallible decisions. Whether, however, these can be obtained by the proposed system; whether the autocratical decrees of a single judge will inspire more confidence, and give greater satisfaction, than the careful investigations and opinions of three professional architects, is now to be tried; but when in almost all the other courts of law we see the decision of one judge often overruled and set aside by his superior court; when a Vice-Chancellor's opinion one day, is declared, by the Chancellor, on the next, to be contrary to equity; and when, as we have lately seen, the whole bench of judges split into adverse opinions upon a purely legal case, one cannot feel perfect confidence or security that even in the proposed court the legal decisions will be more strictly legal than they are or might be under the present system.

It would be presumptuous, however, to give a decision upon the merits of the two systems, or to call in question the judgment of the Commissioners of Woods, &c. in proposing the new Act, without being acquainted, as they must be, with all the causes of failure under the present Act. It is understood that such an inquiry has been made by them, and as this inquiry forms the basis for the proposed changes, which amount to a *supersedeas* of the official referees, and is almost a penal Act against the whole architectural profession, depriving it of official station, the evidence which has been taken on the subject should be laid before Parliament.*

The merits or demerits of the proposed Bill, and the discussions that will principally arise thereon, are all the results of the suggested appointment of a single judge combined with the arrangements of a County Court. In these respects it has gone a wide step beyond the Bill proposed last year by Lord Carlisle, which, while it established a single judge, retained the then architectural referees. This shadow of a Bill but precluded the coming round of a fully-developed legal court, and, if it is really necessary to revise the present Act, with a view to reform the working of the court, if the present Bill is not merely one of those dioramic or dissolving views of change with which the profession has been annually amused, the building interest in general must now come to a decision, either for adopting the principle of the proposed court as now suggested, or recommending the principle suggested by Lord Carlisle.

The advantages of a single judge with an open court and magisterial jurisdiction, are obvious in many cases, and will probably be acquiesced in, on the whole, as an improvement upon the present system. The objections to the details of the Bill are also equally obvious, and must have struck every professional reader of the abstract which was published in THE BUILDER in a late number. The ap-

* This has since been done.

pointment of a deputy judge seems inconsistent with the principle of the Bill, as every one would be desirous of obtaining the highest legal authority which the Act affords, and would be discontented with a secondary jurisdiction. The single "architectural referee" standing at the elbow of the judge and indoctrinating him with his own peculiar professional opinions is not a picture which will please many litigants. The proposal that such architectural referee shall alone have the supervision of all public buildings, and that consequently architects even of the highest standing will be legally compelled to submit to his *dicta* on all points of construction, instead of having, as at present, the opinion of three professional gentlemen, is almost an insult to the profession at large.

Lord Carlisle's Bill, retaining the three referees, has several points of superiority to the proposed enactment. The judge in the latter Act has certainly the power of sending a case to arbitration by consent of the parties, which is no more than they could do themselves without the Act. Lord Carlisle's Act provided the court of reference ready formed for the purpose.

By Lord Seymour's Bill a jury of five persons may be summoned to try cases of rights and easements, cases, of all others, the most unfit for jurymen (who would probably be shopkeepers) to decide. Here, again, the fixed court of reference would be more appropriate, and would be able in a short time to collect and adjudicate on such a number of cases as would be a means of definitely fixing the right and laws of the subject,—a point which can never be obtained from jury verdicts without the revision of a superior court.

In the proposed Bill there is a right of appeal on all matters of law to one of the superior courts on a case drawn by the judge himself. Such appeal is strictly necessary, but the right should be extended to other cases even at the risk of increased litigation.

The alterations in the schedules require the careful examination of the district surveyors, upon whom the responsibility devolves of executing them in a satisfactory and complete manner; and it is to be hoped that they will enforce the principle of non-interference with private rights, and endeavour to confine the regulations to the real objects of the bill, for preventing fire, maintaining party-walls, and enforcing obvious sanitary measures in the construction of houses. T. L.

THE GEOMETRIC PROPORTIONS OF ANCIENT ARCHITECTURE.*

IF we consider what are the conditions necessary to be fulfilled in every case in which beauty is aimed at in a building in order to produce that half sensuous, half intellectual gratification which in modern language is expressed by the term æsthetic enjoyment, we find that three principal conditions are essential. The first of these is stability or balance inclining to the safe side; but a perfectly well built and perpendicular wall may fully satisfy this requisite in so far, and yet have no claim whatever to beauty, merely because it is *safe*.

The second, therefore, is, that the first condition, viz., security, should be combined with indications of insecurity met by sufficient support, so that the imagination and intellect should be at once aroused to the consideration of this contention of forces. Of this nature are projecting mouldings, cornices, &c.

The third is, that in relation to, and subservient to the two first conditions, ornament suggestive of other ideas, connected with the intention of the building in question, should be added, in order that it may directly address itself to the intellect and imagination in other respects.

It will be evident that the last condition here entirely depends upon the previous fulfilment of the two former, for where the general proportions, as well as those of the individual parts that indicate construction or points of balance, are unknown, the superfluities cannot be rendered perfectly congruous with the whole. For its accomplishment, therefore, the highest genius is required, and in its failure the greatest amount of ignorance is displayed.

If it be true that ornamentation must be as subservient to the two first conditions as it was studiously rendered by the Greeks, then a perfect knowledge of the balance of forces in as far as the entire building is concerned, will be required in the first instance, and a truly artistic and poetical conception of congruity and intention in the second.

It is this combination of mechanical knowledge, and artistic feeling and education, that has rendered the highest class of architectural design so very rare in the world's history.

The discovery of the works of Vitruvius, at a period which otherwise might have given rise to a new and grand style of architecture, supplied a set of arbitrary rules which have for centuries proved a complete barrier to the investigation of fundamental principles. There exists in most minds a much stronger tendency to take for granted what they hear boldly stated than to think for themselves: rules are more easily received than principles, and well asserted quackery ever finds more and more strenuous believers than the most elaborately proved truth. So it is with the pure empiricism of Vitruvius; and his method of dividing the lower diameter of the shaft into sixty degrees, by which to measure every other proportion, is still universally followed. This could not have been the case had he possessed even the slightest acquaintance with the methods pursued by the architects of the buildings he describes, and which all admire; for he would then have known not only that this is the very worst, because least certain, proportion of the order he could have selected for his metre, but he would also have been aware that no metrical method could possibly represent the various proportions found in the different styles by numbers. This authority is now, however, on the wane, since it has been discovered that the best Grecian models do not correspond with his rules. Several very ingenious attempts have lately been made to discover general laws of proportion to supply this want; but while it enhances our admiration of the skill of the ancients to find that their works correspond with laws of which those who designed them were ignorant, all these theories have this defect in common, that, although they prove the correctness of the proportions adopted, they could not have originated the forms. What we have to look for is a *method of construction* at once simple and practical, which, though founded on mathematical principles, may yet be sufficiently intelligible to those ignorant of mathematics to enable them to use it.

The want of such a system has resulted in the general adoption of a mode of teaching architecture most perfectly calculated to discourage originality of thought, and to bend the mind of the pupil down to a slavish submission to merely asserted authority; whereas, if taught in a right spirit, all the elements of this art being the purely mechanical forces, it ought, of all others, to produce the most directly practical thinkers. The pupil was taught to copy capitals and bases of columns detached from their shafts, and to retain these and their measurements as invariable rules, without, perhaps, ever being shown an example of the order drawn in its complete proportions,—so that, it was impossible he could even conceive their proportions in reference to the entire building.

He learned rules, but of principles he necessarily remained utterly and entirely ignorant.

Educated as an anatomist, in the full belief that if we have but the capacity to understand them, and the patience to investigate the works of the Creator, we shall find no less to admire in the wonderful adaptation of the different organs to one another, and as parts of the entire frame, than in that of the excellence of their individual structures; and, considering the architectural monuments of Greece among the highest attainments of human genius, which, in so far as they went, were perhaps the nearest approach in perfection to the works of the great architect of the universe, I felt inclined to investigate them in nearly the same spirit of humility with which the physiologist would proceed to study a part of the animal frame with the uses of which he was unacquainted: to assume them as perfect, and to deem no part useless, superfluous, or unmeaning, and no proportion adopted without a reason.

Conducted on these principles the investigation has resulted, as I trusted it would, in the discovery of a system as remarkable for its simplicity as for the universality of its application.

Architecture in Greece is evidently an imported science, as there exists no evidence of any intermediate step from the rudest to the most perfect works, such as may be found in the more primitive countries — Assyria and Egypt,—and to show whence it was derived and how its principles originated it is necessary to examine the mode of building prevalent in these countries. Their climates were arid and timber scarce: the walls were formed as they are there at the present day, of dried mud: the roof, also of dried mud, rested on horizontal rafters: the walls were made as high as the timbers of the roof were long, and the mud roof being thick and heavy, required support. In the façade of an Egyptian temple, the natural arrangement of scaffolding to support the roof that formed a square with the walls, would suggest not only the proportions, but even the fanciful ornamentation of the columns by which the scaffolding was to be replaced. This square space might be divided by upright posts into two, or three, or four rectangles, each calculated to receive a column; but three was the usual number in Egypt, and the attention of freemasons is directed to the remarkable manner in which the methods to be pointed out correspond with the traditionary symbols of masonry,—such as the three steps of masonry, Jacob's ladder, the tesselated pavement, &c. &c.:—all this, the lecturer considered, went far to prove that though their meaning had been lost for full 2,000 years, the symbols and traditions had been wonderfully correctly handed down from perhaps a much more remote period, and directly from Egypt. The square formed between the flat roof and the walls early became a rule in masonry, which was never afterwards greatly deviated from. The architecture of Greece differed from that of Egypt in form, but not in principle, showing that the Egyptian order of priesthood, that represented by our architects and civil engineers, taught principles as well as practice, and that their Grecian disciples, though bound down by all the mysterious vows of secrecy still to be found among freemasons, were able to emancipate themselves from the thraldom of rule that oppressed everything in Egypt, and to devise new applications suited to a climate in which it was necessary to guard against rain as well as heat. They introduced the sloping roof and the frieze for this purpose, and thus gained additional space for the introduction of appropriate ornament.

Now with regard to the construction of the Parthenon, deemed one of the most perfect of the Greek temples: finding that its façade, including the pediment, occupies a space of nearly two squares set side by side, let us work in one of these squares by dividing it equally into four parts horizontally, and then again perpendicularly in like manner into four: it is thus chequered or tesselated into sixteen small squares, which, regarded perpendicularly, resolve themselves into four tiers, each composed of four squares:—take away the topmost row of small squares from the roof and cornice, and there remain four tiers, each composed of three squares high. These severally indicate spaces in which to erect a column with its entablature. Now, let us dismiss this chequered square from present consideration and confine our attention to one of those spaces containing three small squares, upon which its own portion of the roof will rest. It will be shown that a few leading proportions of the order may readily be found within this space, and as it would be impossible to demonstrate more in this cursory manner without fatiguing the audience, I will ask you to believe me when I

* The following is a part of a lecture delivered at the School of Design, Manchester, by Dr. Charles Bell, one of the members of the Council of the School.

tell you, that by pursuing the same method further, every, even the most minute, proportion and moulding of capital, frieze, triglyph, and cornice, may be drawn without a model so accurately, that it shall perfectly correspond in every respect with drawings made according to actual measurements of the building. Let us then represent one of these spaces by drawing on a large scale a rectangle three times as high as it is wide for the Doric order.

The topmost line represents the bottom of the cornice or weight of the roof to be supported, and the long sides represent upright beams of scaffolding. If we draw the diagonals of this rectangle (and call it X No. 1) we form, as it were, a joint stool for the ends of the weight to rest on. Through the centre of X draw a horizontal line to the sides of the rectangle: it divides the rectangle into two. Draw the diagonal of the upper half and call it X No. 2. It will be found to cut X No. 1 in two points, and these intersections invariably give the true diameter of the shaft in its upper third both in this and in all the orders. Now pursue the same course with X No. 2 as we did with the first X, by drawing a horizontal line through its centre: this cuts off one quarter from the whole rectangle: draw the diagonals of this uppermost quarter and call it X No. 3. Where X No. 3 cuts X No. 1 is invariably the line of the architrave. We have thus found two important proportions, viz., the lower part of the entablature, which in itself constitutes a weight in addition to the roof, and have also found a leading measurement of the shaft of the column. To show that the latter proportion is a true one relatively to the weight of the roof and the length of the column, bisect the uppermost line of the rectangle which we said represented the weight, and join its centre by two lines with the angles at the base or ground line. This represents a conical support for the middle part of the weight of the roof, and it will be observed that this passes exactly through the intersections of X No. 1 with X No. 2, showing that that part of the shaft concentrates, as it were, the principal lines of pressure and of support between the base line and the roof. Now divide the rectangle by letting fall a perpendicular from the apex of this triangle or cone upon the ground, through the centre of the column, and join the lower end of this perpendicular with the two ends of the line of the architrave drawn through the two intersections of X No. 1 with X No. 3: this will represent the bearing on the base of the lowest point of the entablature or weight pressing downwards and inwards, and where these lines cut the lower limbs of X No. 1 will be the diameter of a straight-sided column or pilaster of the order at that point: join these points with those found in the upper third of the shaft on each side, and produce them downwards to the base and upwards to the horizontal line (drawn through the middle of X No. 2), you will thus form the shaft of a column (without entasis) which will answer the minutest measurement of the actual column of the Parthenon; for, if perfectly correctly drawn, and the base be divided into sixty parts, you will obtain a measure by which to test every other proportion by authority—such as the height of the shaft, the diameter of the neck, and the distance between any two columns or intercolumniation (by doubling the distance between the base of the column and the side of the rectangle). If you now draw lines from the apex of the tall triangle to the ends of the line which divides the rectangle into two, you will find that they cut the upper limbs of X No. 3 in the exact line of the bottom of the frieze, and give the just width of the triglyph. In like manner every part of the order may be found till all is completed, and then, when compared with the model, the compasses will prove the accurate correspondence of some thirty or forty different proportions with the actual measurement of this splendid monument.* In examining this method, it is particularly deserving of attention, that every ornament introduced in the lines of pressure and support, such as the triglyph capital, &c. and every fillet of the cornice actually represent the contention of the opposing forces of gravity and support represented by intersections of these lines. The entasis, or bulging of the column, is esteemed such a point of dispute and difficulty, that I must shortly indicate how it is produced before I leave the Parthenon. For reasons connected with the science of optics, this was made chiefly conspicuous in the corner columns, which are seen against the light; whereas pilasters close upon a wall were made straight, and columns but little removed from one nearly so. To form the entasis, divide the lower half of the rectangle into three equal parts, or half squares, by horizontal lines, and join the ends of these lines with the opposite superior angle of the original rectangle. Now divide the upper third or square of the rectangle into four equal parts by horizontal lines. X No. 1 joins the top of the rectangle with the centre of the line which divides the rectangle into halves, or fourth half-square from the bottom. Now join the extremities of the next or second line from the top with the middle of the third line from the base; then those of the third line from the top with the second from the base; and, lastly, the third quarter (below the line of the architrave) with the middle of the base line: the intersections of these lines give a series of points which, when severally joined vertically, and produced, as before described, for the straight-sided column, will result in a beautiful parabolic curve or entasis, which falls on the same point of the base line as the pilaster.

Hitherto we have only considered one order of architecture, the Doric; but the same principles, slightly modified as respects the cornice, when a base is introduced for the column to rest on, will enable us to construct every other, and so perfect is the method, that we find the ornaments peculiar to each order grow out of the intersections of these and other lines, so that the allotted number of flutes in the shaft, the proportions of the capital and frieze, &c., and even their very forms and ornaments, become almost a necessity instead of being left entirely to the guidance of the taste of the architect.

The proportions of the columns and entablature, technically termed "the order," are, however, very subordinate to those of the building as a whole; and to want of consideration of the principles on which this is regulated in reference to the site it is designed to occupy, we owe most of the errors fallen into by modern architects, who have adopted Grecian models for our public buildings.

A tall narrow tower on the top of a hill makes but little appearance, its elevation being trivial compared with that on which it stands; so also a long low line of building on a plain is mean, considered architecturally. The Greeks well understood the effect of contrast. In proportion to the height and distance of the intended site they extended the width of the building, to give it dignity and importance; and the Parthenon on the top of the rock of the Acropolis, accordingly received two squares for its façade; but look to the unhappy effect of placing proportions designed for such a site on a level with the eye, as exhibited in the Manchester Exchange portico, far too heavy and massive for their situation. The inhabitants of the plains of Ionia, with no better sites for their temples than gently swelling knolls, felt this, and gave generally the proportion of a square and half to the façade, or rather two squares divided into five, omitting to fill up the two external spaces with columns: with this modification the height of the rectangle in which the column was formed was four instead of three times its width, and the proportions peculiar to the early or Athenian Ionic pillar were thence derived; and for columns *in antis* the still more perfect proportion of four and a half squares, the whole being well adapted to be viewed from a moderate distance. For a confined space in a city and on level ground, a still taller proportion was required for the elevation; and thence arose the Corinthian order of a square divided into six parts, or two squares, omitting two spaces or sixths at each end, giving rectangles of five times their width, in which to form their tall columns, subject, however, to modification. The warehouse of Messrs. Hargreaves, a handsome Corinthian edifice in Meal-street, Manchester, well shows how little these proportions suffer from being viewed in that narrow space; whereas the new Scotch Church in Grosvenor-square, in the same style, and beautiful near at hand, appears almost ugly from Oxford-road, and suffers greatly in comparison with an inferior but better placed building, the Charlton Townhall, of Doric proportions.

* To what extent is Dr. Bell acquainted with the investigations of Mr. W. P. Griffith in this path?—ED.

A PICTURE ON GLASS.

WE have recently seen a picture enamelled on glass, by Mr. Edward Baillie, from Mr. John Wood's "Shakspeare Reading one of his Plays before Queen Elizabeth and her Court," which is intended for the Great Exhibition. It is 6 feet by 5 feet. It exhibits a high degree of finish, and is painted in a style rarely attempted in this country, being, in truth, not "stained glass," but a *picture on glass*, with qualities peculiarly its own. It must have cost much time, anxiety, and trouble: the artist must have had strong faith and energy to enable him to carry it through on speculation. We hope his labour and skill will not pass unrewarded. On the left of the picture is Sir Walter Raleigh (statesman, seaman, soldier, chemist, and historian): the next is Lord Southampton; and then comes William Shakspeare. The Queen is the central figure, dressed in the gorgeous style for which she was well known. Lady Hunsden, Lady Nottingham, and Lady Southampton, make up the group.

The ruby glass in the different parts of the picture is of different manufactures: the curtain at the back of the Queen is Belgian, the dress of Sir Walter Raleigh is French, and the carpet and shoes of Shakspeare, &c. are English. The secret of making this colour was for a long time obscure, and every attempt to produce it was a failure. We may remark that in ancient recipes for making ruby glass, the metal "gold," precipitated by a solution of tin, is given as the colouring matter: modern science proves that ruby for window glass cannot be produced in this manner: a specimen, however, of the colour produced by gold is shown in the upper dress of Queen Elizabeth, which is coated on one side only: the colour where the hands, jewels, &c., occur is, previous to enamelling, removed by fluoric acid.

The term "enamelled," on glass, used in describing this picture, will perhaps be better understood by the following remarks. In ancient or mediæval figure painting, the effect of light and shade is produced simply by covering the surface of the glass with a coat of brown, after which the high lights are etched out, then the darker shades are painted in: such parts as are required to be yellow are stained on the back, also the flesh tints, and for this purpose once burning is generally sufficient.

Enamelling on glass includes, in addition to the above-mentioned process, the use of orange, red, blue, rose colour, &c., as required to produce the life-like effects of a portrait: these being highly vitrified on the glass become portions of it, similar to the enamelling on copper, with this difference, that the colours used for glass are of a transparent nature, whilst those used for copper are "body colours," being shown on a white ground. When we say that the heads and principal parts of this picture have been burnt five times, it will show the time, risk, and trouble entailed on the painter by this style of art.

This picture is composed of nearly eighty pieces of glass, which are fitted into a copper frame: the joinings are almost imperceptible, and, with the exception of Shakspeare's legs and feet, do not interfere with the effect of the whole.

ARCHÆOLOGICAL INSTITUTE.—On the 6th inst. the usual monthly meeting was held in Suffolk-street. Sir John Boileau presided. Many interesting objects were exhibited, and several papers read, including one on the *Bulla* (a Roman neck ornament), by Mr. Yates.

THE SPIRIT OF PRECEDENT IN DECORATION, AND NOT THE LETTER, OUR GUIDE.

If we should go so far as some would have us, and admit that classic and mediæval forms and proportions must remain unchangeable, I think that the same rule will not hold good in decorative art; for as most of the classic and mediæval forms are necessitated by the constructional peculiarities, they are in some measure confined within the limits of mechanical laws, while, on the other hand, decoration is governed by the taste, the imagination, and sense of beauty and fitness, whose larger and freer sphere alone can put any limits upon it. Even among those who admit and practise new combinations and beauties in general arrangement and composition, and whose works show how much thought and patient care has been bestowed upon them, we find too often that their details have scarcely a feature that is at best more than an imitation of ancient work. The first pleasure experienced on contemplating a good building, where this heedlessness of detail (as a thing worthy of close attention) is manifested, will be found to be chilled, when we look closely into the design; for, with the general composition, the evidence of thought and design ceases, the hand becomes feeble, and is content to take up conventional forms, and to follow in the old dusty track, by a copyism that blindly follows what others have previously laboured to produce. In the impression that a building leaves on the memory of those who are able to appreciate the art that has produced it, and even on less educated minds, will be most frequently found the criterion of its real merit; and just in that degree that the designer's mind has been master of his whole work, will it be capable of conveying to others the poetry of his art.

The architect writes his mind on stone and wood; and whether it be mean or noble it is stamped there for present and future generations to read. How then will the work of that one be looked upon who is content to hand down the subterfuges and imitations of degenerate taste appended to his design? They are to his building what artificial flowers would be if grafted on a living stem: like these his ornament can only be beautiful because it imitates what is more beautiful, and it falls infinitely short of it, because wanting all true life. If, then, we continue to copy what at first was the artist's expression of what he saw in the natural forms around him, we not only lose the teaching of nature, but generally miss the artist's interpretation of it as well, and the work becomes our version of his genius.

The mediæval architects were remarkable for their heedlessness of precedent in this respect: their fixed laws were in construction and general design chiefly, and great latitude seems to have been allowed in the best ages of pointed architecture. We forget when we take these details on trust, that their chief beauty is in the efforts they show to follow nature with no intermediate teacher; and at that very point where they leave her for another their art begins its decline. We cannot look at the details of any of our cathedrals, or even of our smaller churches, where the stems of vine and ivy trail in the hollow mouldings, and the boss, like a bunch of flowers, grows from the arched roofs, where the garlands mantle the capitals of the pillars with their foliage, and faces gaze from walls and arches, and not feel that the workman did not go to the buildings he had seen for his ornament, neither did he count the cost of his work and try to put up something that would cost least time, thought, and money. His was a labour of devotion, a sacrifice willingly rendered back to Him who gave the power to conceive it. His models he gathered from the green earth or the living creature in the imaginings of his mind and the histories of Scripture or the emblematic legends of saints. All are types of some thought, even of evil passions and hatreds as much as of devotion and praise, for among the numerous grotesque figures are many that speak plainly enough contempt and irony, and rivalry the most bitter; and some of the faces are the very impersonations of wickedness. Instead of scoffing at the rudeness of these, it would be better for us if we were to strive to follow their earnestness; for, manifold as their defects are, few can so forcibly embody an expression or a meaning, and too many now work without having any meaning to embody, but are satisfied with the so-called correctness of their style. The very foliage often seems to be typical. In the oak and thorn and ivy leaves are the emblems of the thick forests that grew round the monks' dwelling-places in their first simplicity, and the beasts and birds that inhabited them have their place in his decoration. Birds and flowers, from their gayer colours, are especial favourites in the illuminations of manuscripts. There are many faces, also, that are self-evident portraits in these, as well as in the paintings, carvings, and stained glass.

It is scarcely possible for the art of architectural decoration to expand till we free ourselves from the love of copyism, and take up in its stead the animating *spirit* of the past. With our added knowledge and increased means, to what might we not attain if we only trusted ourselves to this spirit. Let antiquarian knowledge be no longer the guide, but rather the suggester, and we shall eventually attain, what it now perplexes so many heads even to imagine,—a new style. Have we not our own history and our own faith to symbolize that we need to cling to those of the past, that are often but barely comprehensible? Are there not more lands and more wonders known to us, from which we may collect our models, than our forefathers had? Why do we even pass by familiar objects to copy their representations of them? Why content ourselves by putting up griffins or dragons, or other fabulous creatures, when the whole of animated nature offers its graceful forms to us, and the simplest weed that grows is a more beautiful and perfect thing than ever was chiseled by man's labour or coloured by his art; and not the earth's surface only, but from its hidden places, we might learn, and turn its crystals and fossils to our use. The sea also offers its beauties to our eyes, in the forms of its shells, its fuci, and corals,—things seldom used in decoration, but certainly most appropriate for sea-side buildings, and those which are used for what appertains more especially to naval purposes. We who live in a new age must not confine ourselves only to that which our fathers knew and practised. Whatever they saw spread out for them is yet more widely spread for us; but instead of turning back and copying their works, let us seek, with the same spirit that they possessed, in that same book in which they sought, and *found*, that which, though old as the creation, is to us ever the newest and fairest. E. W. L. C.

PLEDGE-DEPOTS FOR THE WORKING CLASSES.

The early advocacy of lodging-houses by The Builder was not without effect in popularising the theme. The extensive clearances made in densely inhabited poor quarters, and the extrusion of hundreds of families from squalid, ill-ventilated, undrained courts and lanes, absolutely required the substitution of other locations; for swarming poverty must have sought shelter in remoter purlieus, where they would cling and cluster in closer and fouler community, or else have emigrated to the county towns or agricultural districts.

It is certain that in the gradual improvement of the metropolis, in keeping pace with the growing taste for embellishment, houses of such a character as might suit the labouring classes have not been built; and equally so that the only chance which now remains for making provision for the operatives is dependent on the construction of suitable lodging-houses at convenient intervals. A porter or even an inferior shopman of New Oxford-street, or of the style-reforming centres, cannot find lodgings at a distance under one mile and a half and frequently three miles from his occupation; and although the higher grade of clerks are receding as far as possible from the centre (some of them by rail) still the relinquished tenements hardly suffice to supply the accruing wants of those who succeed them. For single men, lodging houses on the model plan may do; but how is the workman with a family of four to six in number to be hived? this latter wants three rooms at 4s. a week, clean, wholesome and convenient; but these he cannot get, nor even two rooms fit for human habitation at that price. Twenty shillings may be considered (allowing for lost time, sickness, &c.) the average wages of the sons of toil, and in this year of free trade, that sum will go further than 30s. would have gone ten years ago; yet how can the father of a family see his little ones pine for food or raiment (which they must inevitably do), if he exceed that sum for lodging.

It is not so much thought of as the subject needs, that a clean commodious apartment not only conduces to the health of a family group, but that the facilities it affords economises time and materially promotes morality. The common saloon *at home*, with a *fire*, often keeps the hard-wrought mechanic from the gin-parlour! What is wanted is the *Family Lodging-house*, with fitments suitable to the advanced state of a fearfully increased and much improved community. That march of science which refines the tastes, whilst it increases the requirements of the higher orders, goes on progressively, and the modes of life which were tolerated last century by the humblest citizen, would now be loathed as unsuited to the circumstance and wealth of this nation, as well as to the era in which we live.

The public baths are certainly a great convenience and luxury to the poor, but the wash-houses, to be convenient, should be *attached to their dwellings:* the mother of an infant family cannot, nor can the sick or weakly roomkeeper, go out to wash.

All the requirements of our social state are now better understood than formerly, because they are more studied. The accumulation of living souls within the focus of London presses upon the fiscal powers for increased provision against general want: the public health, as also the public peace, demand it: the laws of nature, as well as the law of God, inforce it.

There is, however, one vast requirement, to which little attention has been paid in this country—one which our neighbours, the French, have long acknowledged and acted on: but as yet, in this metropolis, no attempt has been made to realise a resort for the people, which has been blessed abroad with the happiest results to millions. As this is a foundation fixed on the first of Christian virtues, and as it is embodied in structures, The Builder may not be a bad medium of a design which has for its corner-stone the Christian basis of charity: this *is a Mont de Pietè*—a great national pawnbroker's warehouse, not at thirty per cent. and tickets and pence, and too often at other extortions, but simply at five per cent. per annum.

Such a per centage (calculated to a month) would be quite sufficient, not only to pay a suitable return for capital invested (such as four per cent.), but would amply requite the numerous hands employed in superintendence and management. In such an establishment not only would a fair equivalent be given for the value of the article pawned, but an *additional extent of time* might be allowed for the redemption of the deposit; for, unhappily, the bequest of paternity, the valued gift, the not-to-be-replaced relique of friendship or love is but too often forfeited, and for ever lost, under the present grinding system of heartless exaction.

I do not say that pawnbrokers are worse than other men, but their vocation makes them callous, and their profits are on the distresses of the needy, for the confiscation of the pledge is the greatest gain to the lender.

Did the rich know this, they would feel for it, but as a body they cannot know it: it is only through the press, and by the narrative of those who "know the short and simple annals of the poor" *they* ever can know it.

There is as much charity as wealth in our happy land: every corner we turn announces it. See St. George's Hospital fronting *two parks!* But look everywhere, on all sides, it is there! How many institutions founded and supported by voluntary contributions,—

hospitals, schools, nay, the very district poor-houses! And yet *we* have no Mont de Pietè.

Of churches we have many, and more every day arise. Is a subscription wanting, thousands flow in for the promotion of religion; but is not the glory of God promoted most and best by conducing to the happiness of his creatures? Charity with us is diffuse, incessant, and indefinite: the countless private calls on humanity are answered, and in too many unworthy instances satisfied. Give the claim only a *body* and *form*, and where was it ever found deficient? This plan, then, of Monts de Pietè (and I adopt the phrase in honour of the French origination) needs but this *body* and *form*—it requires but the advocacy of the press—it has but to be held up to the sympathies of the rich, and the result will be sure to be the successful establishment of institutions which, in times of poverty, sickness, and calamity will yield inestimable, because prompt, succour to the indigent population,—the source of labour and the stay of the empire.

Commerce may prosper and wealth accumulate amongst the section of proprietors, but unless that wealth be diffused, and the condition of the multitude (the producers) be also improved and ameliorated, the nation cannot be said to prosper: the aggregation of property in vast hoards benefits not, for whilst it elevates some above their natural sphere, it depresses the great mass below the rights of humanity; and the extreme of luxury on the one hand renders that privation the more severe under which the poor, on the other hand, are languishing. QUONDAM.

THE POSITION OF THE ALTAR OR COMMUNION TABLE IN EARLY CHURCHES.

I AM sorry to be obliged to trouble you again on this subject, but I will strictly obey your injunction, and not follow Mr. Elliott in converting a simple question of fact into a theological discussion. I might fairly leave the question as it now stands, as Mr. Elliott having expressed an opinion contrary to the established views of those having the same material to judge from with himself, and having, as it appears to me, failed in bringing any kind of evidence in favour of his opinion,* the ordinary rules of discussion render it needless to go into evidence on the subject. Besides this, being simply an architect, and having neither the time nor learning for an inquiry which might set one wandering through the whole range of ancient fathers and church historians, I am only anxious to show that the *onus probandi* still rests with your correspondent, and that he, in stating a novel or unusual opinion, ought at least to have given it *as such*, and not to have stated it in terms calculated to lead the uninformed to suppose it an admitted and incontrovertible fact.

Mr. Elliott's more important assertions may be condensed into three:—

1. That in the early churches there was "nothing resembling the nature of the sanctuary"—"no semblance of a holy place."

2. That there was in them "no semblance"—"nothing even to remind men of an altar."

3. That though there was a raised platform at one end of them, on this "the communion table was *never placed*, but invariably stood in the midst of the congregation."

On the first, I will mention that we learn from Bingham that the *bema*, or tribunal, was, in addition to its ordinary name, called "The Holy"—"The Holy of Holies"—"The *Sacrarium*;" and that the same word is sometimes used for it by which the Seventy designate the sanctuary in the Old Testament. Bishop Sparrow speaks of the "*αγιον βῆμα*" (*the holy tribunal*), "the *sanctuary*, railed in, of old" * * * "that it might not be pressed upon by the multitude." Wheatly speaks of the "*sacrarium*, since called the chancel;" and it is notorious, that Eusebius, in the passage so frequently quoted, speaks of the "*Holy of Holies*" being surrounded with a screen or railing. These authorities are sufficient to throw upon your correspondent the burden of proving that there was "no semblance of a holy place."

On the second assertion (that there was no semblance—nothing to remind men of an altar), it seems almost absurd to bring authorities to prove the prevalence of the contrary opinion. Bingham seems to feel this, and says "we never read of any such dispute in the primitive Church; for ancient writers used both names indifferently, some calling it altar, others the Lord's Table," &c. Mede actually doubts whether it is called anything else than altar by writers of the two first ages, which is, of course, saying too much. It appears that Ignatius, Irenæus, Origen, Tertullian, Cyprian, Chrysostom, Zeno, &c., &c., all use the term altar. I am aware that Ignatius is not a certain authority, but there is evidence enough without him; and even the interpolations of his works will come within the range given us by Mr. Elliott. Eusebius uses the same word; indeed, it seems to have been always used indifferently with other terms, though it is true that the early Christians admitted, *as between themselves and the Pagans and the Jews*, that they had no altars—meaning that they had no altar for the bloody sacrifice of slain victims. The fact of its being in the earlier ages of wood does not affect this question, as even in the Jewish tabernacle both the altars were mainly of that material. Bishop Sparrow says that the "names altar or holy table were used for the same things, though most frequently the fathers and councils use the word *altar*." With such evidence before him, how can Mr. Elliott say that there was nothing in the ancient churches "even to remind men of an altar?"

The remaining assertion is that the holy table was never placed in the chancel, but always in the midst of the congregation.

That it was in one sense often in the midst of the congregation, I admit, inasmuch as the chancel or sanctuary was not limited usually to the mere projecting apse, but protruded into the church, so that some portions of the congregation were on either side of it, as in the case of a modern church with chancel aisles. This, however, is not, I apprehend, what Mr. Elliott means; he claims for it a place altogether external to the *cancelli*. The famous passage in Eusebius on this point has, I believe, by some been held to favour Mr. Elliott's view; but if so, what is the meaning of the innumerable regulations as to who were and who were not to be admitted to approach the altar? The oldest English translation I have met with (A.D. 1584) gives it thus: "But this man having finished the temple, and the most high seates for the presidents honor, againe having placed the underseates in a passing good order, and last of all the most holy place, the altar being set in the middest: againe, he so compassed these things with wooden rails wrought up to the top with artificial carving that too many might not come therein." Bingham says on this, that it "is not to be interpreted, as some have misunderstood it, of the altar's being in the middle of the nave or body of the church, but in the middle of the *bema*, or sanctuary, at such a distance from the upper end as that the synthronus, the seats of the bishop and presbyters might be behind it."

The Chevalier Bunsen in his "Basilicas of Christian Rome," after quoting this passage from Eusebius, explains it that "the altar was in the middle of the square" (*i.e.* the intersection of transept) "enclosed behind by the clergy, on both sides by the magisterial persons, so that the entire space was shut off from the rest with screens, in front against the people, on both sides against the catechumens." I think he is slightly mistaken about the magisterial persons, probably understanding the *Soleion* to be referred to. Bingham, however, gives good reasons for understanding this of the presbytery; but this does not affect the case that the altar was *within the cancelli*. The talented reviewer of M. Bunsen, in the *Quarterly*, clearly lays down the whole arrangement, and describes the altar as "*within the sanctuary* more or less advanced towards the choir." The late Mr. Hope, Professor Willis, Wheatly, and Bishops Beveridge and Sparrow, give it precisely the same position Siegel, in his "Christlich-Kirchliche Alterthümer," says that in the latter half of the fourth century, the council of Laodicea (A.D. 361), refused the laity admittance to the altar," and that it was "early the custom to separate the choir, *the place where the altar stood*, from the nave of the church with screens." Again, in describing the church of St. Sophia, from Procopius, he says, after mentioning the *cancelli* and their gates, "In this *bema*, or *αγιον αγιων*, stood the altar or holy table." Thus we find it to have been in old St. Peter's; thus also in the early cathedral of Canterbury, said to have been copied in its arrangement from St. Peter's; and thus I may boldly say it clearly appears to have been placed in every ancient church of which we have any description extant: how then, when we find it precisely in this position in the Basilicas, as they have come down to us to the present day, can we assert that it is a modern alteration, and that in early churches it was *never* placed there?

Of the churches anterior to the time of Constantine, we know but little, but that little does not militate against what we know of their successors. It would be absurd to expect that the upper rooms, in which the early disciples worshipped in small and select companies, should present all the same arrangements with a church for a mixed congregation at a period of more advanced extension of Christianity; but, as the churches of Constantine were the immediate successors of those destroyed throughout the empire by Diocletian, it is reasonable to suppose that their arrangements were the same, though their decorations were far more magnificent; and Eusebius's description does not appear intended to point out any novelty of arrangement.

I think I have said enough (though the case is so obvious that I feel almost to be trifling with your readers by going into it) to prove that the old churches, according to the received opinion, had a *sanctuary* and an *altar*, and that the altar *was in the sanctuary*. I will now add, that they had, for the most part, in advance of the sanctuary, a *choir*, enclosed by a second range of *cancelli*; thus we have, firstly, at the extreme end, the seats for the bishop and higher clergy; secondly, the altar, with its *cancelli*; thirdly, the choir, with its *cancelli*: as, though of later date, in San Clemente, and nearly as in the early cathedral at Canterbury. The great change from this to the later arrangement was to bring the seats of the higher clergy forward into the choir, and the doing away with the second or sanctuary screen, which gives us at once our ordinary chancel arrangement; a change quite unconnected with any religious innovations. To these innovations are to be attributed the multiplication of altars and the increased exclusiveness of choir screens,* but the main change was one simply of convenience. The depth, too, of chancels had nothing whatever to do with transubstantiation, but simply arose from the increased number of the clergy or choir to be seated, and was not a constant feature, but varied directly with the number of persons to be provided for, which accounts, on the simplest utilitarian principle, for the extraordinary varieties of length which we find in our old chancels. The main divisions of our churches, *i. e.*, the sanctuary, the choir, and the nave, agree precisely in principle with those of the early churches, differing only in the altered position of the clergy, who, instead of sitting behind the *altar*, are placed, if about to officiate at the communion, at the side of the altar, if otherwise, with the choir; so that, notwithstanding all the admitted innovations of the Middle Ages, the grand primitive divisions have been constantly adhered to, and are still retained by our own church,† though carelessness or igno-

* The passage cited from Justin Martyr is *absolutely silent* on all the questions at issue.

* I have, for brevity's sake, avoided going into the peculiar arrangements of the eastern, as distinguished from the western church. I may mention that the credence table, or table of prothesis, was not one of the late additions, as Mr. Elliott supposes.—See Bingham, Siegel, &c.

† The concession of our reformers as to bringing forward the altar table, at the time of communion, is no sufficient ground for Mr. Elliott's claim upon them as agreeing with him. There can be no doubt that they had not had much opportunity of searching into ancient

rance have too generally caused them to be lost sight of. S.

CISTERNS, LEAD PIPES, AND WATER SUPPLY.

We return to the appendices to the "Report on the Supply of Water to the Metropolis," issued by the General Board of Health, chiefly to make some extracts from the evidence concerning cisterns and lead pipes. Dr. Arthur Hasaall being asked,—

"Have you made any examinations of cistern water?" says,—"I have, many. A cistern is a small reservoir, and has all the faults of reservoirs: the water contained in it is generally exposed to light, air, and the sun, and the dead and living organic matter, as in the case of the reservoirs, too often goes on accumulating from day to day, the former seriously contaminating, by decomposition, the purity of its water: the living organic productions present in the water of cisterns resemble those of the water of the company by which it is supplied: certain forms, however, become developed in the water of cisterns with great rapidity, as the *entomostraceæ*, especially *cyclops, quadricornis, lynceus longirostris, daphnia quadrangula, infusoria, conferveæ*, and *diatomaceæ*: the *entomostraceæ*, and some of the *infusoria*, swim freely about in the water, while the *conferveæ* and *diatomaceæ* either adhere to the sides or else fall to the bottom of the cistern, together with the grit and dead organic matter, forming an ever-increasing mass, which is stirred up on each renewal of the water only to subside in still greater quantity, until after the lapse of weeks, months, or even years, some fortunate accident, or frequently the offensive and putrid state of the water causes the cistern to be cleaned, and a removal of the putrescent and noxious matter. On making inquiries as to the frequency with which cisterns are cleansed, I was astonished to find how generally they are neglected; a neglect which is to be explained partly by ignorance of the necessity which exists for repeated and careful cleansing, and partly by the inconvenient and absurd position in which cisterns are very generally placed, mounted high up, frequently just over the privy or closet, and often requiring ladders to reach them; but the evils of cisterns are not merely aggravated by neglect and bad management, there are faults of construction connected with them: thus the bottom is usually level, and the tap inserted about two inches above this level, leaving a space for the continued accumulation of grit and dead and living organic matter: this evil might be obviated by having the cistern of a rounded form at the bottom, the discharge pipe issuing from the centre. Lastly, the material of cisterns is bad: they should be made of glass, earthenware, or marble."

He was questioned as to the actual effect of sewer-water:—

"Have you any evidence to show that sewer-water does contain sulphuretted hydrogen in such large quantity as to be prejudicial and even fatal to animal life?—With a view of determining this question, I made the following experiments:—1st experiment. A given quantity of Thames water, known to contain living infusoria, was added to an equal quantity of sewer water: examined a few minutes afterwards, the animalculæ were found to be either dead, or deprived of locomotive power and in a dying state. 2nd experiment. A small fish placed in a wine glass of sewer water, immediately gave signs of distress, and after struggling violently, floated on its side, and would have perished in a few seconds, had it not been removed, and placed in fresh water. 3rd experiment. A bird placed in a glass bell-jar, into which the gas evolved by the sewer-water was allowed to pass, after struggling a good deal, and showing other symptoms of the action of the gas, suddenly fell on its side, and, although immediately removed into fresh air, was found to be dead. These experiments were made, in the first instance, with the sewer-water of the Friar-street sewer: they were afterwards repeated with the water of six other sewers on the Middlesex side of the river, and with the same result, as respects the animalculæ and fish, but not the bird: this, although evidently much affected by the noxious emanations of the sewer-water, yet survived the experiment.

Would you infer from these experiments that sewer-water, as contained in the Thames near to London, is prejudicial to health?—I would most decidedly; and regard the Thames, in the neighbourhood of the metropolis, as nothing less than diluted sewer-water."

As to the use of *lead* pipes and cisterns, Dr. R. Angus Smith says:—

"The use of lead pipes is common enough; and although the danger from lead has often been pointed out, there is no diminution in the amount used. It is acknowledged that with soft water, lead is very dangerous; but I am disposed to think that it is dangerous even with hard, except when a crust forms upon it. When a lead pump is used, no matter how hard the water is, there is still lead to be found in it. In one case I found lead where there were 62 grains of lime salts in a gallon: the family filtered the water, but that did not quite remove it, although it was much improved. This shows the lead to have been in complete solution, although the water was hard. The pump was made of lead, so that there was a constant friction preserving the surface clean and assisting comminution.

In another case, where there was a lead pump and well, the water also coming from a badly-drained and putrid underground, the water was acid, and an acid salt of lead was found in the water, strong enough to have a distinct taste of lead, and otherwise nauseous from the other salts, such as nitrates and chlorides. A few bubbles of sulphuretted hydrogen made the whole of a deep brown instantly, and it was lamentable to find that the persons who used it did not suspect any evil from this source.

The use of zinc in lead pipes has been proposed as a remedy, but it is not desirable to drink even zinc. There is a lead pipe made in Manchester covered with tin: a very thin film of it protects it considerably from the action of water acidulated with acetic acid. Probably for water-pipes it may be very useful. It is time that some change should be made in the small water-pipes now made of lead, and that the use of lead pumps and cisterns should be done away with, unless they can be protected."

Up to this time it has been broadly stated that *soft pure* water acts more powerfully on lead than hard water. Evidence is given to show that one is not more injurious than the other.

Mr. Spencer (of Liverpool) says:—"Those who have observed the destructive effects of hard water on cisterns, especially in Liverpool, where the water is pre-eminently hard, but who have not studied the matter chemically, have been at a loss to account for some of the scientific opinions so much at variance with their daily observation. In a word, the closet-experimenter has usually come to the conclusion, that *soft water only* acts upon lead, while the practical observer finds that cisterns are more rapidly corroded by hard water: hence has arisen so much conflicting opinion. A little reflection, however, will render it obvious that the effects of practice can scarcely be observed by the mere immersion of slips of brightened lead into glass vessels containing either hard or soft water, and there suffering them to remain for a few weeks, perhaps only so far covered as to prevent evaporation or the accession of dust.

It must be recollected also that, as cisterns are constructed, lead is not the only metal which has to be dealt with; there being the solder which is used for the joints. Now this substance, which is an admixture of lead and tin, will, when immersed in water along with lead, act as a distinct metal, and give rise to a voltaic action between the lead, the solder, and the water. This will cause a rapid corrosion at the joints, but it will be more or less active *in proportion to the hardness or chemical impurity of the water.*"

A working plumber, William Millard, gives the following evidence:—

"What is your observation of the different action of hard and soft water on leaden cisterns?—The hard water eats the cistern away: the soft water, that is rain-water, does not sensibly touch it at all. The hard water of Highgate will, in a few years, eat the bottom of a leaden cistern entirely away, so that it will be useless.

In how many years?—In about three or four years.

Does not a leaden cistern usually last longer than that in Highgate?—No; it eats holes in the bottom, particularly at the places where there is solder, giving it a honeycombed appearance. This is so much the case, that it is a common custom here for the people to have their cisterns painted.

Is that a protection?—Yes, if the paint be allowed time to get thoroughly dry before the water is let into the cistern, the water does not act upon dry lead, and the cisterns will then last for years."

DOING THINGS BY HALVES AT ST. PAUL'S.

THE proposal which originally appeared in THE BUILDER of throwing open to the street the entire western front of St. Paul's, has been compromised by the dean and chapter, by allowing the gates of the enclosure to stand open for the general promenade of the public. The object originally contemplated was to give greater effect to the building itself as seen from the street, while at the same time the entire thoroughfare would be greatly improved. The project was set aside by the authorities chiefly upon the ground that the space in question would be merely made the resort of the idle and the mischievous. The result, however, of the present arrangement is, that all the nuisance and inconvenience apprehended in the first instance is actually provided for by affording a large enclosed playplace for every little idle urchin and ragamuffin in the neighbourhood, while neither the public at large, nor the immediate inhabitants of the vicinity derive any adequate advantage from the change. The only proper way to make the improvement complete, is, to adopt the basis of Mr. Barber's plan: that is,—throw open the roadway to Queen Anne's statue, run a light iron hurdle or fence along the bottom of the steps to prevent the intrusion of children or improper persons, and set back the present iron railings on each side as far as the north and south doors, close to or within a few feet of the church.

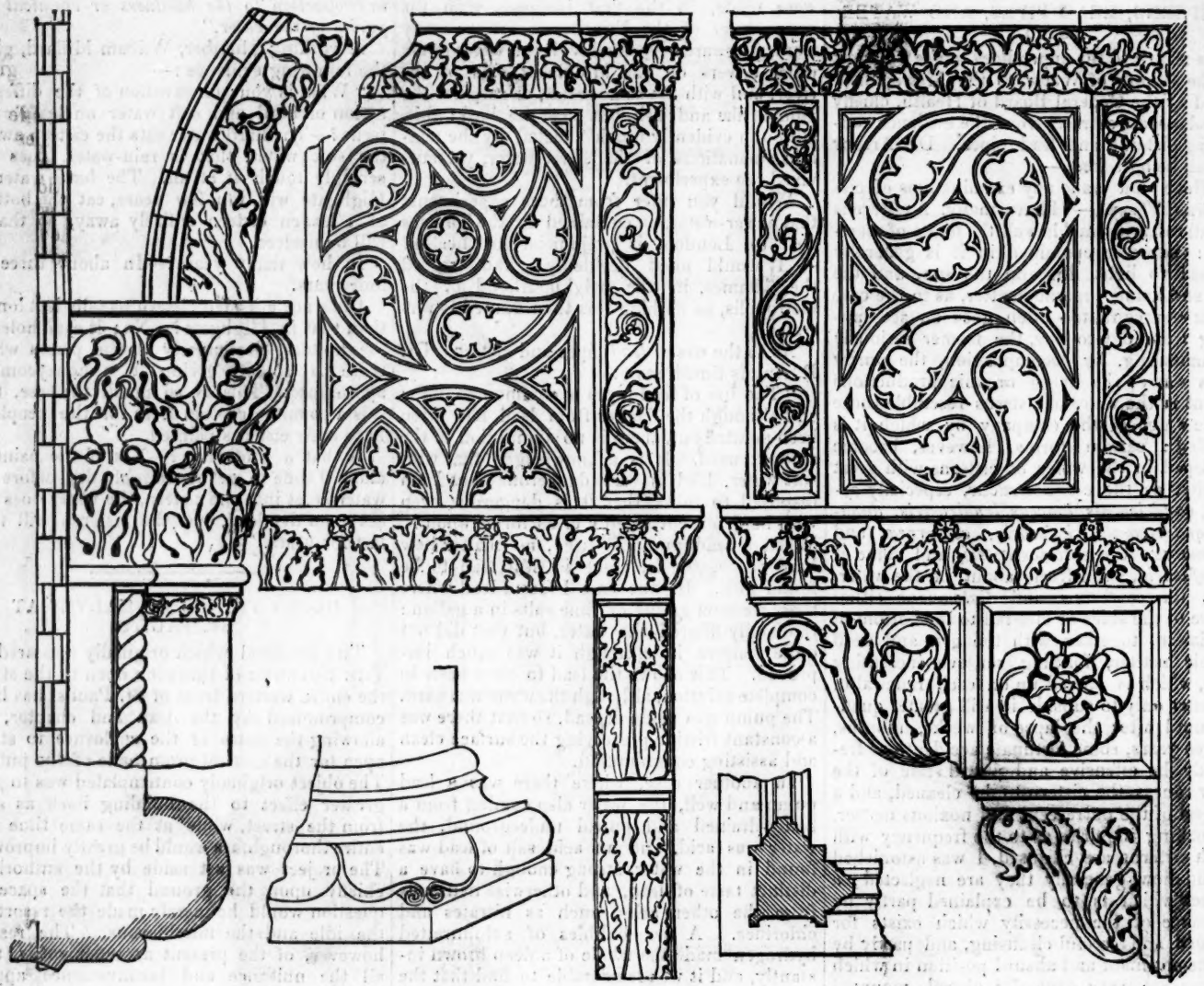
The effect of the whole would be a clear and unobstructed view of the great western front as seen from the street, with an ordinary thoroughfare between the statue and the steps; while on the northern side the omnibus stand which now encumbers the roadway would be put farther back, leaving standing-room as well as space for carriages to draw up to the surrounding shops; and on the south side the main road would be relieved of the coach stand.

Where so great a public advantage is to be obtained at so trifling an expense, surely it is unwise of the parties concerned to oppose any longer the alteration. WATCHMAN.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—After a general meeting on Wednesday, the 12th inst., the council and some of the members dined together at the Freemasons' Tavern, under the genial presidency of Mr. James Heywood, M.P. Sir George Strickland, Bart., Mr. Wilson, M.P. (Clitheroe), Mr. Heyworth, M.P. (Derby), Mr. Pettigrew, Dr. Lee, Mr. Planché, Mr. Baily, Mr. White, Mr. Halliwell, and others spoke, and a very pleasant evening was spent. Sir Oswald Mosely has been elected President for the present year, and the congress will be held at Derby.

arrangements of this kind, and were desirous of conceding in some slight degree to their foreign coadjutors. Bucer, we find, told them, that "in ancient times churches were built in a *round* form, and not *long*, like ours, and that the place for the clergy was always in the middle," assertions for which even Mr. Elliott will not thank him! He argues from this, that "our division of the chancels from the churches was another article of treason against God!" In the face of this, our reformers ordered that "the chancels should remain as they have done in times past."

DETAILS OF PALACE DEI PERGOLI INTAGLIATI.



IL PALAZZO DEI PERGOLI INTAGLIATI, VENICE.

This is a beautiful specimen of the Gothic architecture peculiar to Venice, and, situated on the Grand Canal, opposite the church Santa Maria della Salute, attracts the universal attention of the passers by: the balconies and the whole of the enriched parts are executed in white marble most exquisitely carved. It is coeval with the celebrated Casa d'Oro, but the projecting balconies of our subject, and their beautiful design, render it by much the more attractive in the present day, the gold and colouring of the other having almost entirely disappeared. The detail shows the profile and part of the front of the upper balcony, and the column and archivolt of the windows. J. T. W.

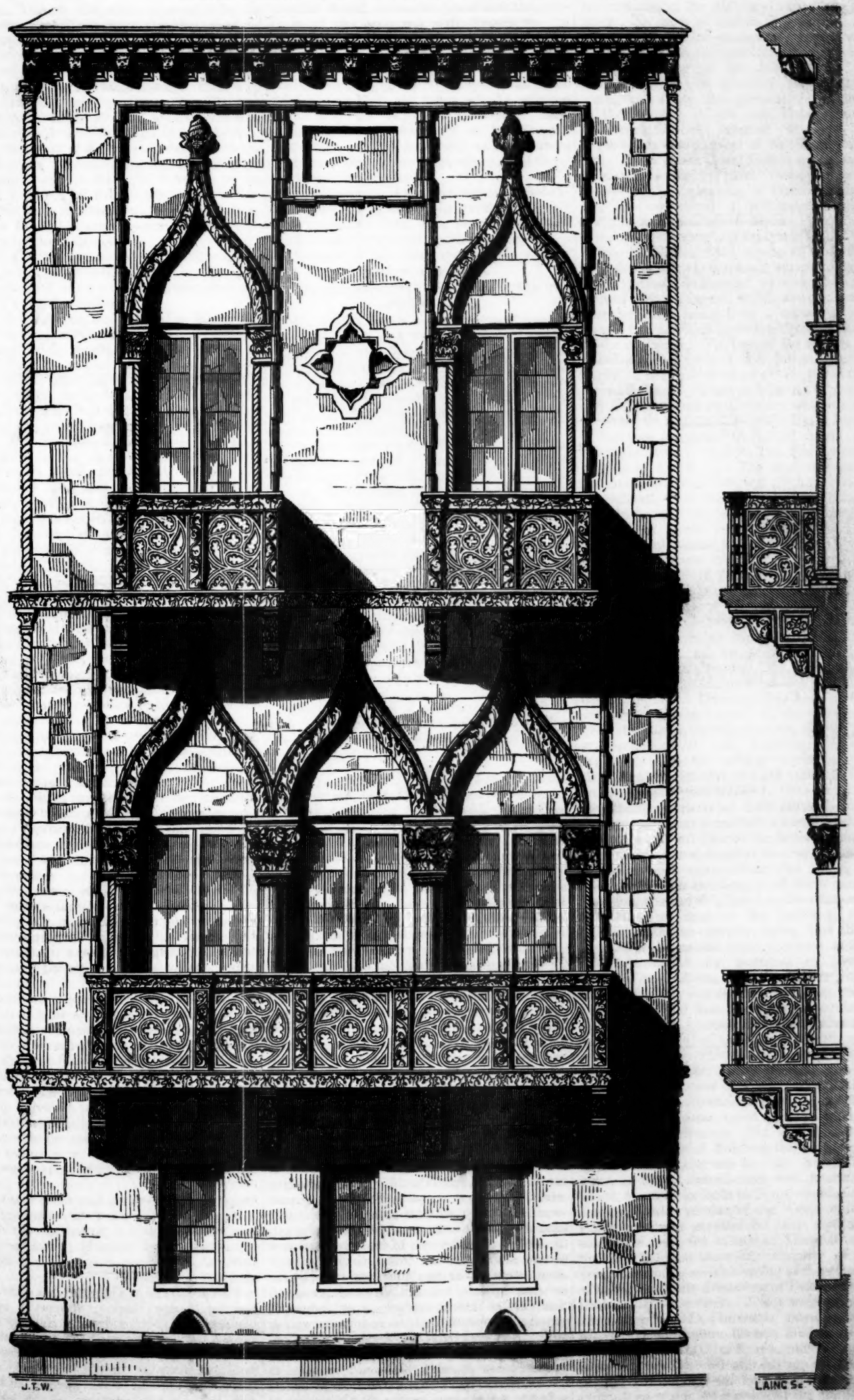
WHAT MIGHT BE DONE WITH PALL-MALL.

Having compared the articles lately published in your journal, proposing certain improvements at the further end of Pall-mall, with the importance and beauty of the situation, I was led to form a conclusion in accordance with the old saw,—"When you commence a work, let it be well done."

Now, I am an advocate for beauty as well as utility; and I consider the first great object to be obtained, next to clearing out the whole of the square of property on this side and adjoining the Conservative Club, reaching westward to Bridgewater-house, would be the restoration of the Palace, Palace-yard, and all the interesting block of building forming the square between Marlborough-house and the Duke of Sutherland's. This I propose to restore to its pristine beauty in the style in which it was built, and remove the present unsightly modern windows and so-called improvements. I then suggest that the next decided improvement (which ought as soon as possible to be effected) would be the entire removal of the Pall-mall side of St. James's-square, throwing the space open: this would not only add to the beauty of the Mall, and in a sanitary point of view be most advisable,—it would especially improve the Army and Navy Clubs, as also those opposite, which, from their height, are sadly deficient of space for the proper display of their proportions, as well as a free admission of light and air. Again, passing through Waterloo-place, and looking from the bottom of the Haymarket, the most peculiar-looking figure imaginable is presented by the buildings as at present placed, purporting to be a triangle—classical to a degree! Here I propose to make considerable alteration. In the first place, you will easily perceive (by reference to the map) that the Haymarket stands nearly equidistant between the farther end of the colonnade round her Majesty's theatre and the end of the buildings forming the angle where Pall-mall East crosses this triangle; also that the east side of the United Service Club is parallel to the large shop forming the aforesaid end of the triangle. Now, if the intermediate property were removed, a new and handsome square would be formed, with a frontage more valuable than the one pulled down in Cockspur-street, forming the fourth side of the proposed new square. To carry out this plan to the fullest, I would propose that the stables lately used by the lamented Queen Dowager be pulled down, and that Carlton House-terrace be at once completed; a new street in continuation of the Haymarket be carried in the same direction, passing through and having its entrance in the proposed new square: this would be found to enter Carlton House-terrace-road exactly alongside the last house on the north side, and would form a handsome and imposing approach to this magnificent range of building, forming also a similar street to the one entering between the Reform and Carlton Clubs. If these improvements were carried out in the liberal spirit proposed by the suggester, I do pride myself as an architect, and a resident of London, that we should have a *coup d'œil* not to be equalled in any town in the world. We should then have Trafalgar-square (when complete, as far as the column, a new National Gallery, and *actual jets of water* are concerned), our new square, which I should suggest might appropriately be called Seymour-square in honour of the First Lord of the Woods and Forests. Then there would be Waterloo-place, greatly improved by a view of the York Column and Carlton House-terrace, seen from Seymour-place, as also by the new entrance. Passing farther on we should be struck by the imposing appearance of the beautiful clubs and houses forming the east and north sides of St. James's-square, as also by the relief given by the gardens, which could be considerably enlarged. Then, coming to the end of our tether, we should have another new square of no mean dimensions (say Morpeth-square), with a view of the two finest mansions in London, and the Green-park with its refreshing verdure between; also the Old Palace, showing to the best advantage its fine proportioned mullioned windows, arched doorways, and embattled parapet. H. B.

Metropolitan Cattle Market.—A Bill for a new market, supported by Mr. Childers and Mr. Alderman Sidney, in the Commons, was presented for second reading a few days ago, but the motion was postponed until the measure brought forward by the Government should be fairly before the House. The Bill for the extension of the Islington market has been read a second time.

THE PALACE DEI PERGOLI INTAGLIATI, VENICE.



INSTITUTE OF BRITISH ARCHITECTS.

THE ROYAL MEDAL.

AT the meeting on Monday last, Mr. C. Fowler, V.P., in the chair, a proposal by the council to present the Royal Gold Medal of the Institute to Mr. T. L. Donaldson, Professor of Architecture at University College, "on account of his merits generally as an architect, both in the design of buildings and in the long and honourable practice of his profession—his liberal and arduous study of architecture both abroad and at home—his valuable contributions to the literature of the art—his devotion to the duties of his professorship, and for his effectual zeal as one of the chief founders of the Royal Institute of British Architects, so honourable and advantageous to the profession, and to the public good,"—was passed unanimously by the meeting.

We cordially concur in the resolution, and trust that Mr. Donaldson, who has but just now recovered from a severe illness, may live long to enjoy his honours.

Mr. J. Fergusson, Associate, then gave an interesting account of the architecture of Nineveh, as elucidated by recent discoveries; a subject which he had selected in immediate reference to the subscription-list which had been opened at the Institute in furtherance of Mr. Layard's researches; and laid before the meeting his ideas of the original appearance of the buildings. Mr. Fergusson confined his remarks principally to the Palace of Khorsabad, explored by M. Botta, the French consul; and exhibited a view and section of that palace restored, to which we last week drew attention.

In the discussion which ensued,

The Chairman remarked the striking similarity between the winged bulls of Persepolis and those of Nineveh.

Mr. Fergusson said, the general resemblance in the sculptures of the two places fully warranted the adoption of Persepolitan forms in restoring the architecture of Nineveh. There was abundance of wood in Assyria adapted for building purposes, and there could not be a doubt that that material was largely employed. The architecture of Persepolis, of Lycia, and of the early cave-temples of India, presented decided marks of being based upon a wooden type. The pillars and the flat roofs had fallen, and filled up the apartments; and to this occurrence was owing the preservation of the extraordinary sculptures now discovered.

Mr. Papworth suggested that the fall of the flat roofs, if constructed of earth, as supposed by Mr. Fergusson, would have prevented the total destruction of the columns by fire, and that, therefore, remains of them might have been expected.

Mr. Fergusson said that was no doubt the case. Several large pieces of timber had been found by Mr. Layard; but it was impossible that that material (especially if cedar) could have lasted, in a country exposed to heavy annual rains; being only protected by a covering of earth.

In reply to a question by Mr. Mocatta, Mr. Fergusson referred, more fully than in his lecture, to the inscriptions on the walls of the palace of Khorsabad. Though the majority of these referred to war and battles, Colonel Rawlinson was convinced that the inscriptions in the state apartments were descriptions, frequently repeated, of the building itself, on the walls of which they were found. This very interesting point would doubtless be further elucidated as prolonged study gave a clearer knowledge of the import of the inscriptions.

Professor Cockerell entered at some length into the suggested restorations of Mr. Fergusson, the correctness of which he considered highly probable. He further adverted to the prevalence of what were usually thought Greek forms, the Ionic capital, the honeysuckle ornament, &c., in the sculptures and ivories of Assyria, which was a matter of much interest.

Mr. Bellamy inquired what proof there was that the radial arch was known and used in Nineveh.

Mr. Fergusson referred to several vaulted chambers discovered by Mr. Layard, which were as genuine arches as any of modern times. The sculptures of Nineveh comprised numerous representations of round-headed openings to doors. Mr. Layard's attention was fully directed to this point, and his discoveries would doubtless prove that the principle of the arch was well known to the Assyrians. In answer to other remarks, he said the floors of the different chambers had not yet been fully explored; but if they were (as they would be by Mr. Layard) he much doubted whether any trace of the original position of the supposed wooden columns would be found, inasmuch as, he thought, above the earthen floor still existing, there must have been some more ornamental flooring which has perished.

Mr. Penrose explained an ingenious instrument for drawing the Ionic volute, partly his own invention; and Mr. Rogers exhibited some beautifully carved book-covers.

The meeting adjourned till the 24th inst.

PRINCESS'S THEATRE, OXFORD-STREET.

MR. DION BOURCICAULT'S new five-act comedy, "Love in a Maze," which has been produced at this house with great and deserved success, has only three scenes, but these are quite perfect of their kind, and serve to place Mr. W. Gordon, and Mr. F. Lloyds (by whom they were painted), high in the ranks of stage artists.

The first scene represents the exterior of an Elizabethan mansion, "Buckethorne Chase, in the county of Norfolk," and both as to the details, truthfulness, and general effect, is excellent. The second, shows an apartment in the mansion, fitted up very completely, with its glasses, cabinets, and chandeliers. It has a carved ceiling, with pendants, and the stage-covering is made to represent a Turkey carpet on an oak floor. The third scene, which shows a garden *maze* (such as at Hampton Court), is perhaps, more noticeable for ingenuity in the setting than for the painting.

We were so placed, thanks to a full house, that all we saw was round a corner, but will still bear witness to the excellence of the work.

The piece is full of wit from beginning to end; and is beautifully acted by Mr. and Mrs. Kean, Mr. and Mrs. Keeley, Wigan, Harley, Addison, and Meadows.

NOTES IN THE PROVINCES.

AT the entrance to Mayfield, from Tunbridge Wells, a new national school for girls has been built close to the existing school for boys. It was opened on 27th ult. The building, which will accommodate 110 children, is of red and grey brick. The plans and decorative parts of the building were given gratuitously by the architect, Mr. Charles Turner.——Eastbourne parish church is about to be reseated.——The intended new church to be built near the station at Tunbridge, will be begun in the course of the spring: tenders for the contract are to be delivered to the architect by 24th inst.——At Hastings, preparations have commenced on the site of the new church. The foundation stone will probably be laid in course of a month. The funds fall short of the required amount. The building is to be ready by Jan. 1, 1852.——The Commissioners of the Hastings Improvement Act are thinking of building a large room for a Corn Exchange over the present market.——Since the stoppage of the new county gaol works at Lewes, in October last, through the failure of the late contractor, Mr. Wm. Trego, arrangements have been completed for contract with Messrs. Locke and Nesham, conjointly with the sureties in the original contract. Shortly after the stoppage, by order of the architect, Mr. D. R. Hill, of Birmingham, the walls of the several wings were thatched over to preserve them. As soon, however, as the weather can be depended upon, the works will be resumed. A number of men are now engaged in preparing masonry flints for face work, &c. The building, as heretofore, will be under the superintendence of Mr. Edw. Stevens, clerk of works for the county, and Mr. John Hawking as manager. The arrangements for ventilation are to be on the same principle as at the model prison, Pentonville,—air-cells running along the basement of each wing. Every prisoner will have his separate cell, with requisite accommodation for ablutary and other purposes. In cases of sudden indisposition, the inmate may receive immediate assistance by ringing a bell in the corridor. The cooking and distributing of the food of the prisoners will be also specially facilitated by arrangements for the purpose.——A tablet to the memory of the late Canon Bowles has recently been erected in the aisle of the south-east transept of Salisbury Cathedral. It is in the florid Gothic style, and is from the *atelier* of Mr. Osmond, sculptor.——Mr. Bigglestone, of Hereford, sculptor, has completed a monumental cross, intended to be erected in Malpas churchyard. It is about 14 feet high. The style is of the Decorated period (*circa* 1350). A pierced cross-flory, with the ball-flower ornament surrounding the centre opening, is elevated on a capital ornamented with ivy leaves, which rests on an octangular shaft, rising from a truncated cone, on one face of which is the inscription in Lombardic character. The base of the cone is surrounded with a circle of ball-flowers; and the angles of the cone terminate upon the shaft in carved finials.——From an abstract of receipts and disbursements on Liverpool water account for 1850, it appears that the ordinary income of last year amounted to 59,733*l.* 0s. 6d., and the expenditure to 54,680*l.* 13s. 6d., leaving a balance of 5,052*l.* 7s. The total income for the three years 1848-9-50, was 173,326*l.* 8s. 11d., expenditure, 145,106*l.* 3s. 7d.: balance, 28,220*l.* 5s. 4d. In 1848 the amount received from water rents was 44,799*l.*; in 1849, 45,848*l.*; and in 1850, 46,343*l.* On the Rivington account there was expended last year the sum of 104,831*l.* 14s. 3d. Of this amount 27,206*l.* has been paid to the pipe contractors; 1,283*l.* on account of the water investigation of Messrs. Simpson and Newlands—1,077*l.* 3s. 11d. being Mr. Simpson's share; and 4,733*l.* 19s. 8d. on account of Mr. Robert Stephenson's inquiry, Mr. Stephenson's account being 2,955*l.* 19s. 7d.——A new school for the blind at Liverpool has been erected, and the chapel re-erected, at the junction of Hardman-street with Hope-street, the old sites at Hotham-street and London-road having been taken for railway purposes. The chapel was rebuilt with the old materials: the interior is still uncompleted. The façade of the school, which is of Bath stone, is in the Grecian style, and consists of a centre and two wings, the ground floor of the former occupied by shop for sale of manufactures by the pupils, committee and ward rooms, &c. This, the front part of the building, is of three stories, the upper rooms being fitted as dormitories for females. The rear of the building, commencing with the corridor, being that chiefly devoted to the institutional appliances, is three stories in height; the basement occupied by kitchens and offices, and the upper rooms principally as dormitories for the males. From the central hall the eye commands the whole range of apartments. The contractors for the rebuilding of the church and the erection of the new schools are Messrs. George and Arthur Holme, of Benson-street.——A new vicarage-house is just being completed in the parish of St. Peter, Droitwich. The chimneys and other parts are of moulded and cut bricks from Oddingley. Mr. J. Smith is the architect, and Mr. J. Shilvock the builder.——On Shrove Tuesday was laid the foundation-stone of a new school-room and preaching-house, about to be built in Hunt's-yard, Great Horton, by that portion of the Wesleyan body which has been expelled for their reforming tendencies. In the village of Great Horton, the expelled constitute the majority of the Wesleyan body.——The letting of the erection of the New Corn Exchange at Barnsley took place on Tuesday week. The successful contractors were—Mr. Robinson, stone mason; Mr. Harrison, joiner; Messrs. Hall and Jenkinson, plasterers; Mr. Brown, plumbing and glazing; Mr. M. Wood, slating; and Mr. Rogers, painting.——A new school-house is about to be erected at Newby, in the parish of St. Mary, Carlisle; Mr. James Stewart, archi-

tect.——At a special meeting of the Edinburgh Town Council, it has been resolved to obtain tenders without delay for the construction of the new slaughter-houses, now to be immediately proceeded with.——The Inverness Harbour Trustees lately obtained from the Chancellor of the Exchequer a loan of 8,000*l.* for improvements of the harbour, by deepening the channel of the river, and constructing a new quay.

MODEL LABOURERS' HOUSE, HYDE-PARK.

IF not too late we would direct the attention of inventors of improved fittings for houses, to an advertisement which appeared in our last impression, from the Society for improving the Condition of the Labouring Classes. Prince Albert, being president of the society, was applied to in reference to a model structure, which they proposed to exhibit at the approaching exposition. The object was no sooner submitted to his Royal Highness, than he expressed deep interest in its accomplishment, and generously expressed his desire to make the building his own, by defraying the cost of its construction.

His Royal Highness has further taken much interest in the arrangement of the plan, and great trouble in obtaining permission to place the building in the stable-yard of the cavalry barracks, Hyde Park, immediately opposite the Exhibition-building, so that the numerous visitors to that centre of attraction may, without trouble, have the opportunity of carrying home some practical suggestion for improving the social condition of the working classes, whose labour so largely contributes to the Exhibition itself.

The plan of the model house is, in its general features, given in Mr. Roberts's Essay on Dwellings, &c., at the foot of page 37: it provides for the accommodation of four families, on a ground and first floor, and the same arrangement is equally applicable to a three or even four story house: each family will have a living-room of about 150 ft. superficial, *three* bed-rooms, a scullery, and water-closet, with a dust shaft.

The upper floor is approached by an open staircase and gallery, on the principle of the Streatham-street houses.

The construction is to be of hollow brick—walls, floors, and roof—rendering the building entirely fireproof.

NOTES ON GAS.

A NEW mode of lighting up turret clock faces with gas-light, perfectly self-regulating, it is said, has been invented by Messrs. Blaylock and Co., of Carlisle. "It lights itself at the proper hour, viz., at sunset each night, and nearly extinguishes itself at sunrise each morning, and follows the setting and rising of the sun from the shortest to the longest day, and again from the longest to the shortest day, with only a half-yearly adjustment."——The *Glasgow Examiner* reports as to another new invention by a Glasgow gentleman, Mr. James Allan, of Buchanan-street. This is a new gas and steam-generating apparatus for mansions, stations, farms, and public works, &c. The gas, like Mr. Stephen White's, is manufactured from rosin. A steam generator is connected with the apparatus, so that food can be cooked, apartments heated, hot water for washing, &c., supplied *ad infinitum*, and very little fuel be required. It can also be very easily taken asunder and as easily put together again by tenants. The apparatus is registered, and is to appear at the Industrial Fair.——The *Expositor* states that "an American has applied for a patent for a cheap and brilliant gas, produced on a new principle, which he states can be obtained at a cost less than 1d. per 1,000 feet. It is said that no wood, coal, or water is required; and that the material can be obtained anywhere. It is a self-acting and self-creating gas, called into action by an impulse of nature, from whence may be derived a new motive power of light and heat. An Englishman also asserts [in a recent number of THE BUILDER] he has a plan by which any one may produce his own gas by a machine like a table-lamp, not costing more, and creating a superior gas, at one-third the cost of coal-gas, requiring only to be turned on and lighted, but that he has not the means of protecting his invention from piracy."——A German, too, is said to have discovered an economical mode of decomposing water into gas for light and heat. This stir about gas throughout the world is something remarkable. Can there be a doubt that it is but the reverberation of our own great national movement and outcry for light—for a poor man's light, for warmth, comfort, and culinary convenience, as well as for cheerful light in every dwelling?——With reference, by the way, to THE BUILDER'S share in this national movement, we have had our attention called, by a correspondent, to an unconscious and unintended, if not a very honourable, tribute to our exertions on behalf of the million, in a "Journal of Gas Lighting" that has lately stepped into the shoes of the defunct *Gas Gazette*, which, like its successor, owed its existence to this movement and to THE BUILDER as its metropolitan leader. In a recent number of the journal in question we are rather amusingly stigmatised—or honoured rather—as "THE monopolist of *incendiary* gas intelligence," although in almost the same breath we are somewhat inconsistently deprived of that honour, and declared to have "confined" ourselves to the mere "repetition of the thousand oft-repeated assertions of all the local agitators of the gas question (*i. e.*, of the *actual multo*polists of gas incendiarism) throughout the length and breadth of the United Kingdom." Waiving this little inconsistency, however, how comical and happy, yet self-stultifying, is the use of the term incendiary in such a relationship to the extension of gas-lighting throughout the country! An incendiary, properly speaking, is one who lights up what ought *not* to be burnt; but the very mission of gas *is to be* lit up and burnt, and he who creates or extends a conflagration of its burners throughout the country, is, indeed, an honourable and meritorious "incendiary." We accept the honor, and thank the donor; but with reference to his further statements or arguments about our mode of exciting the movement, we shall once for all only say that statements and arguments founded on falsehood and misrepresentation, may very easily be knocked up into an *imposing* structure, but are themselves rather quixotic objects of attack, unworthy even the expenditure of that single breath which knocks them down. Besides, we formally challenged all opponents, over and over again, while *in* the field, and how is it that not one dared to accept the challenge or appear against us till we had, as formally, after being for years in "incendiary" harness, announced that our initiative work was done, and that we, therefore, had deliberately laid down our weapons and retired from the field? It is not now worth our while to turn even a single step aside from our other onerous duties—and we shall not do so—even were a "lion in our path." Let the foe who only ventures to pounce upon us now that our eye is off him and his purpose, be satisfied with this little singeing of his whiskers by the "incendiary's" torch. It is too late now for *him* to attempt to extinguish that right-sturdy torch of truth: indeed, the gas-torch has already passed out of our hands into those of the "local agitators," to whose tender mercies we hereby, once for all, consign him.——Our readers may recollect of a reduction, some time ago, of the price of gas at Whitehaven (from 8*s.* to 4*s.*, if the statement now made by a contemporary be correct), and of our confidence that such a reduction, in place of injuring the company as stupid calculators prognosticated, would be for their benefit no less than for the benefit of the public. That result has already in this, as in so many other instances, been fully realised, the company having lately declared a dividend of four per cent. for the last *half*-year.——The Liverpool company, who were compelled to make repeated reductions, every time with protestations of their impossibility, and every time with benefit to themselves, until at length their own representative in a Parliamentary examination *advocated* further reductions still, in order to increase still more their previous profits,—are now again in so prosperous a condition that it is stated in a recent report of their affairs, that although "it was not unreasonable to suppose that so large a reduction in price as 25 per cent., which took place in 1845, was sufficient to preclude any hope of the rate being further reduced;" yet that "it would appear that even this hope may be realised at no distant period."——The price of gas at Bangor is to be reduced from 10*s.* to 8*s.* 4*d.* in the beginning of next month.——Bognor is about to be lit with gas: the building of the gasometer is already in progress, and the pipes are being laid with all possible despatch.

FOREIGN INTELLIGENCE.

Berlin: a New Cartoon by Cornelius.—The completion of any new work by this master creates always great sensation with our German neighbours. The present cartoon represents the *Resurrection*, and is the third of the series for the Campo Santo of Berlin. This mystical picture represents an angel reposing on a rock,—beside him the book of life and death, yet unopened, while his right has grasped the sword of justice. His pensive features express a high earnestness; the sentiments of one of heavenly descent, who, with deep sorrow, fulfils his office against a portion of humanity. The sentence, however, which he has to pronounce is already expressed in nature and in the mind of those risen. Those to the left appear full of terror and despair, while those to the right and in the centre are animated by heavenly joy. Amongst the numerous surprising beauties of this composition, we may mention the figure of a female amongst the reproved, lying on the ground. It is the body of a heroine, whose powerful form is rendered with an energy and grandeur of style which reminds us of the finest examples of Grecian sculpture. But the pervading idea of this great picture is, that it is nature herself, the bent of mind and soul, which leads some of those here represented either to beatitude or reprobation.

Munich Art-Union.—At the late distribution of prizes, ninety-five oil paintings, three aquanells, three paintings on porcelain, two drawings, and six plastic works were disposed of. Amongst the former, forty-three were landscapes; of which an Alpine torrent, by A. Zimmermann, a charming moonlight by Morganten, and an *incomparable* scenery of a storm, are chiefly remarkable. Of architectural pictures, a "Hunting Villa," by Kirchner; a "View of Venice," and the "St. Lorentz Church, at Nurnberg, deserve notice.

Excavations undertaken by the Archæological Society of Dijon.—This society, who have found that the locality about *Laudanum* was of great antiquarian interest, have obtained from Government an especial grant for this undertaking. After having cleared off the *débris* of a *balneum* and *tepidarium*, there was found to the east of the baths, and on the western slope of the hill the substratum of a square tower, which was close to the walls of the old city. Its base, composed of *statumen*, forms above the ground a widening, indicating that it has served as a reservoir for the water already used in the baths. In the midst, a pretty large excavation seems to indicate a *hypocaust*, hewn in the main rock. The whole circumference of the *termæ* has been also cleared, whose length is 31 metres. Ancient pottery, and some basso-relievos, have been also hitherto discovered.

STAFFORD PUBLIC BUILDINGS COMPETITION.—The successful competitor for the "Stafford Public Buildings" is Mr. John Young, Jun., of London. Fourteen designs were furnished to the Committee of Selection.

BRIDGE BETWEEN CANADA AND THE UNITED STATES.—The *Toronto Patriot* announces that "the magnificent bridge between Lewiston and Queenstown, Canada, near the falls of Niagara, had been so far completed that the engineer had crossed to the American side. The bridge is the largest structure of its kind in America."

THE SAPPERS OF THE SURVEYORS.

I AM glad to see that more than one of your correspondents have noticed an abuse of which they have just reason to complain,—the employment of hired soldiers to take away the business of the professional surveyors. I do not write in a party spirit: I do not attribute the evil to any particular individuals:—the mischief appears to me to arise naturally from that system of centralisation which we of the present day have so strangely allowed to obtain a footing in almost every institution of the country. The plan is essentially military. It requires that uncontrolled and irresponsible power shall be lodged in the hands of a few individuals, and that their orders shall be executed by subordinates, whose sole duty is passive and unreflecting obedience. I have watched the growth of the system for years, and have long foreseen the effect it must ultimately have upon the prospects and the character of all professional men. It is under this system that the surveyor, after having at a great expense become qualified for his profession, sees the money taken from him in taxes employed to enlist, train, and teach a body of soldiers, who are then sent out to attempt the very work by the performance of which alone he can hope to obtain a livelihood. I feel assured that the wrong will ultimately extend to all professions, and I heartily wish that it had begun with some class of men who would not have submitted so tamely as the surveyors. I should like to see a wealthy rector stopped at the church door by Private Murphy, with "sure your Riverence and myself will do the praiching to-day, and resaive the money to-morrow,—by order of the commissioners." Or I wish that Corporal Kane would attend at the rent-day of some rich landlord, with orders to receive the rents on behalf of his commanding officer. The growth of the evil would then be stopped.

I consider it too late for the surveyors to complain: to them the mischief is done; and it is therefore with pleasure that I watch the extension of the injustice to the members of other professions, from whom I trust it will meet a more efficient resistance. I. T. S.

IMPROVEMENT OF LAMBETH AND SOUTHWARK.

OFFICE OF WOODS.

THE districts of Lambeth and Southwark have for a length of time been expecting some announcement as to what will be the extent of improvement when the Woods and Forests determine where Westminster-bridge is to be erected, when the roads there are determined, the new market for meat and vegetables settled, the course of the metropolitan sewerage determined, and the lines for the railways. All these matters have from time to time been promised.

Do, pray, Mr. Builder, tell an anxious proprietary the situation in which they will be involved. The Office of Woods, by thus delaying the announcement of their plans, are doing great injury: inevitable ruin must be the result to many. A SUFFERER.

DISFIGUREMENT OF KENSINGTON GARDENS.

FROM the east side of the Serpentine river in Kensington Gardens, and from the road in Hyde Park, there is a charming prospect to the west through a broad, open, grassy glade towards the old Kensington Palace. When the Serpentine was cleared out last year, one of the places chosen in which to deposit the mud was this lawn-like glade, there being, of course, a thousand equally convenient spots concealed by the trees close at hand. Now surely every person, from the highest to the lowest, who was concerned in this proceeding, should be publicly reprimanded. Not content, however, with this insult to the public, the mud deposited in other places, out of general observation, has been carefully removed, while the above is suffered, at nearly a year's delay, to remain. Is not this a case of such stupidity as to call for an example on its perpetrators?

DAVID SINGLEHEART.

ARCHITECTS' BENEVOLENT SOCIETY.

THE first annual meeting of the friends of this charity was held on Wednesday afternoon, at the Freemasons' Tavern, Mr. Sydney Smirke in the chair. The report of the Council was read and unanimously adopted. This recently-established society has for its laudable object the administering the same kind of relief as that which has been so long supplied by the Artists' General Benevolent Society, but confining itself exclusively to the regularly educated members of the profession of architecture, and although it has only been founded a few months, it has received very considerable support. At the close of last year about 150 gentlemen had become annual subscribers, and 30 or 40 more had since joined. The sums received up to the 31st of December last amounted altogether to 390*l.*, of which 300*l.* had been invested, and the remainder left to be applied to the ordinary purposes of the society. Some large donations had been received this year. The Royal Institute of British Architects had kindly granted to the association the use of their rooms for the meetings of the council, thus effecting a considerable saving to the society, and adding greatly to the convenience of its members. The council had drawn up a complete code of bye-laws, which was read to the meeting, and, after some discussion, was approved of and agreed to. After other routine business was done, thanks were voted to the chairman, and the meeting separated.

We cannot but feel a deep sympathy in the charitable objects of this society, and we earnestly call upon those members of the profession, especially in the provinces, who have not yet become acquainted with this institution, to lend their assistance in furtherance of its interests.

THE ARCHITECTURAL EXHIBITION.

AT a meeting of the committee on the 11th ult. it appeared that all the old supporters of this undertaking are determined not to forsake it under the difficult circumstances of the present year, and several new names were announced (many of them well known in the profession, as subscribers and as promising contributions of drawings. We must, however, observe that the circular put forth has hardly received that response which the object merits. We think there can be no question but that the undertaking will be carried through, and probably gentlemen will find cause to regret hereafter that they have not the credit of having joined in the earliest stages. We hope that before the next committee meeting those who are animated by a desire to see their art appreciated and advanced in public estimation will have come forward, and put the committee in a position to incur the liability necessary in the heavy rent of a gallery. No time should be lost, as every suitable place is being rapidly engaged for other purposes.

GRINDING AND POLISHING PLATE GLASS.

THE grinding and polishing of plate glass by machinery is perhaps the largest example of the production of plane surfaces by grinding, and a brief outline of the mode of proceeding will be here offered.

In the manufacture of plate glass, the materials are first fused in melting pots made of Stourbridge clay, which measure from 30 to 40 inches diameter, and 3 to 4 feet high. The pots are made in the form of a truncated cone, being rather smaller at the bottom than the top, and are capable of containing a sufficient quantity of the melted glass to form four or five plates of the largest size. After the materials have been thoroughly fused together, a sufficient quantity of the melted glass to form a single plate, is removed by iron ladles from the large melting pot to smaller pots called *cuvettes*, which have been previously heated in another furnace. The glass, now in a pasty condition, is placed in the pots while they are in the furnace, which is then closed up, and kept at a considerable heat for some hours, until all the air bubbles have been expelled and the glass is sufficiently fluid to be poured.

The pot is then removed from the furnace, and carried on a truck to an iron table or bench, having a flat surface about 18 feet long and 10 feet wide: two bars of iron of equal thickness to the desired plate are laid upon the face of the table near the edges. The fluid glass is poured on the table and spread with iron or copper tools: an iron roller about 15 inches diameter, equal in length to the width of the table, and weighing about 30 cwt. is rested upon the two iron bars, and traversed over the face of the glass to roll it out like dough to a uniform thickness. To insure the rotation of the roller in a straight line along the plate, it is provided at each end with toothed wheels that work in corresponding racks fixed on the sides of the iron table, and the roller is drawn along the table by means of two chains, coiled around the ends of the cylinder and worked by a windlass.

When the glass has been rolled flat, the cylinder is received at the end of the table upon two arms counterpoised by means of levers placed beneath, so as to allow of the heavy roller being raised or lowered by two or three men. The plate, still red-hot and yielding, is slid from the table upon the flat surface of a carriage, which is wheeled to the annealing oven, upon the bed of which the plate is pushed and allowed to remain for several hours to cool gradually.

The plates, when cold, are examined as to their condition, and such plates as present defects in the glass, or irregularities in the surface that it would be tedious to grind out, are cut with the diamond into smaller pieces; but the nearly perfect plates are kept as near their full size as possible, and merely squared on the edges.

The plates of glass now measure about half-an-inch thick, and the surface is full of small irregularities, presenting a mottled appearance, the roughest side being generally that which was placed downwards upon the bed of the annealing oven, and copied all the irregularities of the bricks of which the bed of the oven is formed. The side of the glass that was uppermost in the oven is comparatively smooth and bright from the action of the fire, although in many cases this surface is not so nearly flat as the lower. The plates have therefore to be ground flat and polished on both sides: formerly this was effected entirely by hand, but of late years the rough grinding with coarse sand, and the polishing with crocus, are almost always done by machinery, and hand labour is only resorted to for the intermediate process of smoothing with fine emery.

The grinding and polishing machines employed for plate glass differ somewhat in construction in various manufactories; but a single example of each will sufficiently explain the general method.

The grinding machines employed for the largest plate glass are arranged in pairs along the grinding room: every pair of machines is driven by one central beam, and consists of two benches of stone 15 feet long, 8 feet wide, and 18 inches high, placed about 10 feet asunder; upon each of these benches one or more plates of glass are embedded in plaster of Paris, close together, and quite level. Other plates of glass are cemented upon the lower faces of two swing tables or runners, which are traversed over the fixed beds by a horizontal frame or beam about 30 feet long: the machinery for driving the beam is fixed in a frame about 6 feet square and 18 inches high, placed between the two grinding benches. A horizontal shaft, fixed underground, extends throughout the length of the grinding room between the lines of benches, and the motion from the shaft is communicated to every pair of machines by a pair of bevil wheels leading to a central crank that revolves horizontally, and has a radius of about 2 feet; the arm of the crank is attached by a pivot to the centre of the horizontal beam. Four other cranks of the same radius are placed parallel to the central driving crank, one at each corner of the square frame, and serve to guide the traverse of the horizontal beam, which is thus swung in a circle of four feet diameter in a manner somewhat similar to the grinding bed for marble, fig. 1099. The beam is supported at various parts of its length by chains suspended from

the roof of the building, which allow of the traverse of the beam, and serve for raising it by means of levers, for the removal of the work.

Near each end of the beam is attached, with the power of adjustment for position, a small sliding frame carrying bearings for the reception of the central pivot of the swing table or runner, which consists of a strong frame of wood covered with boards, and measuring 8 feet long and 6 feet wide, placed face downwards upon the bench: a central pivot stands up from the back of the runner, and enters the bearing fixed on the horizontal beam, which thus communicates a circular swinging motion to the centre of the runner, exactly the same as that of the driving crank; and the runner being free to revolve upon its pivot, acquires a continual rotation around its own axis. By the combination of the two movements, the relative position of the fixed bench and runner are continually changing; this tends to the mutual correction of the two surfaces of the glass, and greatly assists the equal distribution of the sand and water used in grinding. The horizontal beam makes about fifty circulating strokes in a minute, and the runners revolve upon their own axes about once to every five or six strokes. The position of the runners upon the driving beam is shifted once or twice during the grinding, to distribute the action as uniformly as possible over the entire surfaces of the glass plates.

The largest plates of glass are nearly equal in size to the fixed bench, and these are imbedded singly upon the bench with the most irregular side upwards; but more generally plates of medium and small size are ground together; they are selected of uniform thickness, and arranged close together upon the bench, with the largest plates in the middle and the smallest at the ends. The runner is covered by one or two plates at most, as small pieces would be liable to be thrown off by the centrifugal force.

All the irregularities of the surfaces are first ground out with sharp river sand, that has been washed and sifted into two sizes; the sand and water are thrown on by hand occasionally, and when the plates have been ground quite flat, the finer sand is employed, and followed by emery of two finer sizes, applied as usual in succession, in order to remove the scratches made by the coarser powders. The plates of glass are thoroughly washed between every change of grinding powder, and when the one side of the glass has been ground with the finer sizes in succession, the plates are inverted, and the same routine is followed on the second side.

The grinding machines do not, however, admit of being employed with very fine emery, as the close approximation of large surfaces travelling over each other at a considerable velocity, causes so much friction that it would be liable to tear the surface of the glass, and, consequently, as the plates become sufficiently smooth to require the application of fine emeries, the velocity and pressure should be proportionally reduced, and a greater degree of care and management is required; it is therefore found to be preferable to effect the smoothing of plate glass by hand.

The plates are smoothed upon stone benches of suitable size, about 2 feet high, made very flat upon their surfaces, and covered with wet canvas. One large plate nearly equal to the size of the bench, and two or three plates of about half the size, are usually given out as a set of work. The large plate is laid upon the wet canvas which serves to hold it firmly, emery and water are spread over the surface, and one of the small plates is used as a grinder or runner. If the plates be large, a few flat lead weights of about 14 lbs. each are laid near the middle of the runner, to distribute the pressure uniformly, and the runner is traversed over the lower plate with a swinging stroke backwards and forwards, so as to describe nearly a semicircle around the centre of the runner, which is at the same time shifted a few inches during the stroke. Every stroke follows a slightly different path from the preceding one, and the runner is also gradually twisted round as the smoothing proceeds. The combination of these movements serves to expose every part of the surfaces of the bed plate and runner to an equal amount of grinding, and also to distribute the emery very uniformly.

Small plates are smoothed by young girls, and large plates, which require greater dexterity and a proportionate increase in the amount of traverse, are smoothed by two women; who stand on opposite sides of the bench, and placing their outstretched hands flat upon the runner, swing it with a stroke of five or six feet. The employment appears most masculine, but it is found that the smoothing is upon the whole executed better by women than men, as only a moderate force is required, and from the greater delicacy of touch possessed by females, they more readily appreciate when any particles of grit have become accidentally mixed with the emery.

About six sizes of carefully washed emery are used in the smoothing, and between every size, the plates, canvas, bench, and hands are thoroughly washed; perfect cleanliness in the clothing is also quite essential, as a particle of coarse grit would make a scratch that would require the smoothing of the plates to be recommenced. The fine emery last employed gives a very smooth and partly polished surface, which is completed with the machine next described.

The polishing machine has a bed 15 feet long and 8 feet wide, that is mounted upon rollers, and slowly traversed sideways, a space of 4 feet to and fro, by means of a rack and pinion beneath. A few inches above the bed are reciprocated longitudinally two beams or carriages, each about 18 feet long and 9 inches wide, and consisting of two cast-iron side-plates connected together at intervals, and supported at each end upon two small wheels, that run upon a short railway at the end of the traversing table. The carriages are placed 4 feet asunder, and reciprocated about 2 feet by means of two cranks fixed opposite to each other on the same axis, so that the beams work in opposite directions, the one advancing as the other recedes.

The plates of glass are embedded close together, with their surfaces quite level, upon moveable platforms that are afterwards fixed upon the traversing bed, and the polishing is effected with a series of rubbers, placed 1 foot asunder, and measuring 8 by 6 inches, covered with thick felt, and attached to the reciprocating carriages, which drag the rubbers backwards and forwards over the surface of the glass, while the latter is traversed beneath the rubbers, a space equal to the distance between the two lines of rubbers, to expose all parts of the glass equally to their action.

Every rubber is separately attached to one of the two carriages, to allow it to ply uniformly to the surface of the glass: this is effected as follows:—Between the two side-plates of the beam are fixed, near the top and bottom edges, two cross pieces having square holes, through which slides vertically a square bar, the lower end of which projects about 2 inches below the beam, and is rounded semi-cylindrically. The rubber is made quite detached, with a central cavity at the back to fit the end of the upright bar, which thus forms a joint that allows the rubber to adjust itself to any trifling irregularities of the surface over which it is traversed, and the rubbers admit of being readily removed while the plates of glass are being exchanged. The pressure is given separately upon every rubber by two lead weights of about 15lbs. each fixed one on each side of the upright bar.

The powder generally employed for polishing plate glass by machinery is the Venetian pink of the colour-man, a cheap powder which contains only a small proportion of the oxide of iron, mixed with earthy matter that renders the powder less active, and allows of the free use of water, which serves to reduce the friction and prevent the glass becoming heated by the action of the rubbers. Tripoli, crocus, or putty powder, used with water, are too active to produce a high polish on glass, and therefore they are generally employed dry for the last finish of glass polished by hand. But the great amount of rubbing surface, the velocity and power employed for polishing plate glass by machinery, render the use of dry powders inadmissible, as the surface would be torn by the friction, and the heat evolved would be liable to break the glass.

Sometimes old plate glass, that has become scratched, is repolished: when the plates are large, and sufficiently numerous, they are repolished by machinery, just the same as new glass, but more generally old plates are repolished by hand, as the process can be then restricted principally to the scratched portions of the surface.

The polishing is commenced with tripoly on cloth rubbers of the usual form, and finished with putty powder or crocus. The pressure is generally given as in hand calendering, by attaching the rubber to the lower end of an upright pole, suspended from a long horizontal spring fixed overhead, like that of a pole lathe. The elasticity of the spring supplies the pressure, and the workman has only to push the rubber backwards and forwards; but the process is both laborious and tedious with large plates, and, from the irregular action of the hand, the surfaces of glass thus polished present a wavy appearance much inferior to those polished by machinery.

Sheet glass or flattened glass is manufactured by blowing the glass first into the form of a spherical bulb, which is afterwards elongated, by alternate heating, blowing and swinging, into a cylinder about 3 feet long and 8 inches diameter, with rounded ends, which, as the last process of blowing, are opened out, and the ends are cut smooth with a diamond traversed in an upright frame around the cylinder, which is then cut through on the one side longitudinally, with a diamond inserted near the extremity of a light rod, and drawn through the inside of the cylinder under the guidance of a straight edge. The cylinder is then placed with the cut upwards in a reverberatory furnace, and the heat causes the cylinder gradually to open as a sheet, which is gently flattened down on the bed of the furnace, with tools like blunt garden rakes, made of iron or wood.

To improve the flatness, several sheets are afterwards laid upon each other in a second reverberatory furnace with a level bed: the heat of the furnace, and the weight of the superincumbent mass, causes the lower sheets of glass to become sufficiently flat for ordinary use, notwithstanding that there are many little irregularities in its surface, arising from the imperfect action of the flattening process. For the best purposes these irregularities are removed by grinding and polishing.*

Books.

Report of the Proceedings of the British Archæological Association, at the Fifth General Meeting, holden in Worcester, in August, 1848. Edited by ALFRED J. DUNKIN, Member of the Committee of the Worcester Congress. J. Russell Smith, Old Compton-street, Soho. Only 120 printed. 1851.

WE have here a pleasant reminiscence, by Mr. Dunkin, of all the various papers, notes, and memoranda collected during and since the Worcester congress, dedicated to Mr. C. Roach Smith, and illustrated with a variety of engravings. The whole forms a goodly volume of 456 pages, besides an index, and appears to be a diligent compilation of the proceedings.

First Book on Plane Trigonometry; comprising Geometrical Trigonometry, and its Application to Surveying. By G. W. HEMMING, M.A., &c. Taylor, Walton, and Maberly, Paternoster-row.

THIS little volume is intended for the use of schools. It contains numerous examples, and, considering the new aspect which the science of surveying has assumed, cannot but be useful as well as interesting to students and others who have had but little time to devote to such studies. It is to be followed by a short treatise on analytical trigonometry and calculation of logarithmical, and trigonometrical tables.

* From the third vol. of Holtzapffel's "Turning and Mechanical Manipulation," noticed in a late number.

A popular Narrative of the Origin, History, Progress, &c., of the Great Industrial Exhibition. By PETER BERLYN. London: James Gilbert.

THIS little book gives, in a concise and agreeable manner, a narrative of the progress of the scheme towards fruition, and an account of the building. It does not pretend to be anything more than a compilation (there was no want of materials); but the account is put together pleasantly, and makes a pretty little book.

The Palace of Industry, its Construction, Machinery, and Statistics. By W. J. B. SAUNDERS. London: Effingham Wilson.

WE have here what may be considered a supplement to the foregoing,—although complete in itself,—namely, a comprehensive and popular account of the *construction* of the building. It is clearly written by Mr. Saunders, and, if we mistake not, has in part appeared from time to time in the pages of the *Morning Advertiser*.

Miscellanea.

RAILWAY JOTTINGS.—Some specimens of timber sleepers, creosoted, which have been laid for nearly eleven years on the Crewe and Chester Railway, are now, says the *Liverpool Times*, as sound as the day they were laid. Specimens of wood thus prepared are intended to be exhibited by Mr. Bethel at the coming Exhibition.——"It is not from through traffic, or from the great termini," says Mr. Glyn, "that we derive our main revenue or our permanent prosperity. We raise the large amount which you see quoted in the returns every week from the development of traffic at 188 stations on our own lines." This is virtually what we maintained some time ago, with reference to certain inconsequent comparative statistics as to omnibuses and railways. Liverpool, with America at its back and Ireland opposite, observes the *Daily News*, only yields, by ordinary train, 1,470*l.* out of the 31,000*l.* a week that appears in the returns. And, in corroboration of Mr. Glyn's experience of the superior value of short as compared with through traffic, we may state that the total annual proceeds of the through passenger traffic from all Scotland, by both the eastern and western lines, does not reach 40,000*l.* a year; and for merchandise to and from Scotland, railways cannot of course compete with shipping.——Railway travelling, says *Herapath*, "is becoming less aristocratic, and assimilating itself more to the omnibus system. If that be the case, which we long ago predicted it would, railways will have to prepare for it by looking after the working expenses. In the instance of the York, Newcastle, and Berwick line, in which the third-class receipts have increased 188 per cent., while the second have only increased 42, and the first only about 39 per cent., we see that 32,539*l.* increase of receipts on the past half over the corresponding half of 1849, has been earned by only an increase of 2,167*l.* in the working expenses." We need scarcely add that we give such quotations much more by way of confirmation of the truth of our well-known views on the subject of railway resuscitation, and rising profits in general, than as anything unlooked for or on which to base new suggestions for future guidance.

ELECTRO-TELEGRAPHIC. — The international organization of the telegraph is in rapid progress. The convention between Prussia and Belgium, placing telegraphs on the lines of railways through both territories in close connection with each other, were to come into operation on 1st February. A convention of same kind already exists between Austria, Prussia, Saxony, and Bavaria. The addition of Belgium to this telegraphic union completes a line of communication, under one system of management, from Vienna to the frontier of France and the shore of the British Channel at Ostend. After the 1st of next month the line will be complete from Verviers to Ostend. Hitherto all communications have stopped at Verviers—now they will only be arrested by the sea.——Messrs. Brett have submitted to the principal English railway companies a pocket communicator for use by guards and drivers in cases of accident by the way. A small roll of wire at once connects it, and hence the train in transit, with any part of the main line of telegraph, so that warning may be telegraphed to, or aid called for from, the next stations.——Herapath, in speaking of the prospects of the electric telegraph in England, says, it will be observed that a new company, the British Electric Telegraph Company, have started for the purpose of more generally extending the system, and on principles of greater economy to the public. We have often thought it strange, in this populous and commercial country, that the electric telegraph should be represented as not paying, while in the United States, where the population is not perhaps a tenth as thick, it should be a most profitable undertaking. It struck us whether it was not an outcry raised for the purpose of securing a monopoly and keeping others out of the field, just as some tradesmen are eternally crying out that business is good for nothing, that they are losing, and yet, somehow, keep on year after year their good-for-nothing business, and continue, not only to live, but to thrive into property, and even fortune, by their losses. [A recent *exposé* shows pretty clearly that this is really the fact.] Fair competition in trade does a great deal of good to the public and to the traders. It stirs up the spirits, calls forth energy, and is the very soul of enterprise and improvement. So sensible are men of business of this, that it is no uncommon thing for men actually to set up in opposition to themselves.

THE FLAXMAN REMAINS.—The authorities of University College have done all honour to the reliques of Flaxman, which have been presented to them by Miss Denman. The portion of the edifice assigned them is to be called the Flaxman Hall: it is a small polygon, rising into a dome, lighted from the top, and presenting four principal sides, as large as panels, each of which contains nine bas-reliefs. The centre of the hall is occupied by the grand life-sized group, "Michael and Satan," the only round composition in the collection. The casts—for these works are all in plaster—are of various sizes, and are let into the wall, and disposed according to their dimensions, as regularly as possible, the vacant spaces being painted in imitation of marble. The works are generally small, and among them are many monumental compositions; but in all these there is a touching story, and the sublimity of the poetic subjects is of a quality which the Greeks themselves have never excelled. University College, however, is fortunate in the possession of these works, the proper place for which should have been the National Collection. In their present site they will be comparatively unseen, save by those whose tastes may lead them to visit Gower-street for that purpose.—*Art-Journal.*

INDIAN ANTIQUITIES.—The Bombay government have engaged the services of Mr. Fallon for a twelvemonth, at 40*l.* a month, for the purpose of obtaining drawings of the Cave Temples of Western India, in compliance with the wishes of the Court of Directors. They have allowed 840*l.* for drawings of the ruined city of Beejapore, but have not as yet found an artist. A magnificent set of drawings of the Caves of Ajanta, by Captain Gill, of the Madras army, got up under the Madras government, have recently been exhibited.

GENERAL CONSOLIDATION OF PAVING BOARDS. — The mal-administration of these boards (their lavish expenditure and defective works) must, ere long, become the subject of inquiry. The annual loss to the rate-payers cannot be less than twenty or thirty per cent. As at present constituted, these boards are incompetent to deal with the matters submitted to them, and not unfrequently select an officer equally so. They are, in many cases, elected from an inferior grade of small shopkeepers, who squabble among themselves and with adjoining parishes. This and the sewers questions have a natural affinity, and should be under a "joint board:" to this should be added cleansing: thus—"sewage, paving, and cleansing." A DISTRICT SURVEYOR.

SALFORD PEEL MONUMENT.—From the agreement entered into with Mr. Noble, the artist, we learn that the statue is to be of bronze, ten feet high, on a stone pedestal, and that unless prevented by sickness or other inevitable accidents, it will be completed by February next year. As to the retention of all the models and designs in the picture gallery of the Salford Royal Library and Museum, the following resolution has been passed:—"That inasmuch as a mutual advantage was contemplated by this committee, especially with reference to the talented youth of the country, the merit of whose productions would thus be brought into notice,—the competition being equally open to this class as well as to those artists who have already obtained distinction,—it is hereby resolved that the said works of art be transferred to the Museum Committee of the Salford Town Council, upon condition that the models and designs of those artists who decline the contemplated plan, be returned to them upon application, provided such application be made within one month from the date of the transfer."

DISCOVERY OF A TEMPLE AT MEMPHIS. —A correspondent of the *Athenæum* states that considerable remains of a temple at Memphis have been brought to light. He says,—The temple was discovered by a French traveller (whose name has not reached me), by excavating in that part of the great Memphite burial-ground which is near the modern village of Aboo-Seer. A dromos of sphynxes, thirty or forty, or even more, in number, was first discovered; and then the temple to which they formed an approach, and which was in a much injured state. In the temple twelve statues of Greek style were found, and above these an excavated chamber. From this it appears that the temple was partly built and partly excavated in the rock—like the temple of the Asaseef at Thebes, and that of Wádee-es-Subooa in Nubia.

EXCAVATIONS ON THE CASTLE HILL AT EDINBURGH.—For some time back numerous workmen have been employed in excavating and building a spacious reservoir at the Esplanade, for the better supply of the inhabitants of Edinburgh with water; and on Saturday week, while engaged in levelling the east end of the Esplanade at the castle, the earth suddenly gave way, and presented to their view a large passage or cavern. Although several cart-loads of stone and earth had fallen in, two men managed to get access into the passage, in which were found a quantity of human bones, a coat of mail, and the drone of a bagpipe! A certificate, narrating the circumstances of the discovery, together with the relics, is to be laid before the Royal Society of Antiquaries. These relics are of peculiar interest to every old citizen of Edinburgh, inasmuch as they appear to confirm the truth of a well-known tradition (of which the writer himself remembers hearing much more than a quarter of a century since), that some hundred years ago a highland chieftain entered a subterranean passage near the castle, playing on a pair of bagpipes, and determined to test the truth of a still more ancient tradition that this passage extended down through the centre of the old city to Holyrood. The adventurous archæologist of old was never heard of more till now that these singularly illustrative relics have turned up.

CAMBRIDGE ARCHITECTURAL SOCIETY. —The third general meeting of this society for the present term was held on 6th inst., the Rev. T. S. Woollaston in the chair. The Rev. Canon Selwyn, of St. John's College, Messrs. H. R. Luard, and T. F. Wickenden, of Trinity College, and Mr. G. Searle, of Queen's College, were elected as members, and Mr. Luard's name was added to the committee. A paper followed, by Mr. O. W. Davys, B.A., of St. John's College, hon. sec., "On the Western Fronts of English Churches." Mr. Luard directed attention to the undergraduates' and bachelors' window at Ely, and stated that about 300*l.* were wanted to complete it. He called on the members to assist in forming a new committee to raise funds, and several members agreed to form a new association to carry out the original plan.

SUBMARINE STEAM NAVIGATION.—Dr. Payerne, says a contemporary, has constructed a submarine iron boat, on the screw principle, measuring 27 feet long and 9½ feet wide, which, according to M. Lamiral, his manager, perfectly accomplishes the purposes for which it was intended, by—1. Alimentation of vital air constantly made under water, without any communication with the atmosphere above water. 2. Direct contact of the screw with the water at any depth, down to 150 feet. The alimentation of air is made by a double process, mechanical and chemical, which maintains, almost without expense, the air perfectly pure and respirable in all hermetical places, such as diving-bells, submarine vessels, ships' holds, mines, &c. The apparent impossibility of maintaining under water a furnace with a current of air is completely conquered by chemistry in its pyrotechnical branch: a certain fuel is consumed in a hermetical furnace, and generates steam in the boilers. Favourable reports of this invention have been made by some of the most eminent men of science, and the Minister of Public Works has appointed a commission to report upon it.

RENOVATIONS IN BANWELL CHURCH, SOMERSET.—Besides some recent works, especially in the chancel, there are now no less than eleven stained glass windows in church and chancel. Seats have been erected in the chancel by the Rev. Chancellor Law and Mr. Emery; but for the erection of the windows, the parish are mainly indebted to the vicar, the Rev. W. H. Turner. Three of the windows are obituary memorials,—the east, of the late bishop, and chiefly containing figures of the Evangelists and Apostles, with embellishments,—the other two, of relatives of Chancellor Law, the one to the north side of the church representing the woman of Samaria at the well, and the other, on the south side, the woman kissing the hem of our Saviour's garment. The memorial windows and the adoption of the old glass are the work of Mr. Warrington, a design by whom has been prepared to embellish the roof. The other stained windows and the fixing of the whole were gratuitously executed by Mr. Trickey, of Banwell.

WAGES IN SOUTH AUSTRALIA.—For the quarter ending June 30, 1850, according to the *Adelaide Times*, the following were average wages:—blacksmiths, 6s. per day; bricklayers, 6s; brickmakers, 2*l.* per 1,000; carpenters, 7s. per day; cabinet makers, 7s.; day labourers, 4s.; masons, 7s.; painters and glaziers, 4s. 6d.; plasterers, 5s. 6d.; sawyers, 9s. per 100 feet,—all without board or lodging.

FALL OF HOUSES, GRAY'S-INN-LANE.—A correspondent, relative to a fall of two old houses recently in Gray's-inn-lane, complains that the district surveyors are lax in adopting measures to obtain the removal of dangerous buildings. The public must be protected, it is true, but if the writer reflect on the loss, often ruin, caused to individuals by the condemnation of their property, he would see a good reason for hesitation on the part of the surveyors.

PROPOSED NEW OMNIBUS ROUTE.—At the present moment, amid the elaborate preparations for the Great Exhibition, it may not be inopportune to bring forward the following suggestions, viz.:—That a distinct and independent omnibus route be formed of the line of road from Hyde-park-corner direct over Vauxhall-bridge, through Kennington, Camberwell, Peckham, and New Cross, to the point where the Dover-road is intersected by that between Greenwich and Lewisham. Any one on glancing at the map will see the great utility of this, not merely for visitors to the Exhibition (destined to be of transient duration), but as creating a permanent link between many populous districts and numerous lines of conveyance,—omnibuses, steamboats, and railways: not less than *three* railway stations would be passed. Permit me to add, by way of contrast and encouragement, that on the northern side of the Thames, a deficiency, parallel with the one I would have remedied on the southern, has been at last supplied by that profitable "omnibus line," the East and West India Docks Railway. FILL-GAP.

THE RUSSELL INSTITUTION.—The third *soirée* for the season took place on Wednesday evening, when Professor Donaldson gave a lecture on "Egyptian Architecture," which afforded general satisfaction to a crowded assembly. The tables of the principal room were covered with choice illustrated books on the architecture of Egypt and Greece, interspersed with curious illuminated missals, &c. Sir Charles Fellowes, who was present, exhibited three models of Lycian tombs, and another of the Trophy Monument at Xanthus, the remains of which are in the British Museum. Among the other objects exhibited were some fine specimens of natural history, designs for tapestry, &c.

THE INTERMENTS ACT.—The hitch in the progress of this measure appears to be caused by the difficulty of arranging with the various cemetery companies. The Board of Health should no longer hesitate to adopt the course pointed out by the Act in this respect.

ST. PANCRAS CHURCH EXTENSION.—The Duke of Bedford has presented to the Church Extension Committee of St. Pancras, a site of ground for a new church, with 500*l.* towards the building fund. The church will be erected in the new district of St. Matthew.

SEWERS: SAD WORK.—A list of tenders for building about 3,280 feet lineal of half-brick sewer, 3 feet 9 inches by 2 feet 3 inches; 200 feet 12-inch stoneware pipe sewer; and 8,000 feet 6-inch pipe drain, for the St. Pancras, &c. Benefit Building and Freehold Land Society, on their new estate called "Longlands," near the Holloway-road:—

J. Gibbs	£1,995	0	0
Pope and Green	1,947	0	0
S. Bowers	1,891	0	0
W. Smith	1,850	0	0
J. Eldred	1,797	0	0
J. Wood	1,776	10	0
J. Salter	1,650	0	0
E. Murray	1,648	10	0
Jarvis	1,642	13	0
Moxon and Gent	1,451	0	0
W. Hill	1,428	0	0
Rogers and Radley	1,229	0	0
R. Batterbury	1,184	0	0
C. Garrett	964	0	0

The work to be kept in repair twelve months.

TENDERS.

Tenders for re-building Messrs. Wetherley's Paper Mills at Chartham, near Canterbury, recently destroyed by fire:—

Carpenters', Bricklayers', and Masons' Work.

Smith	£5,530	0	0
Gambier	5,092	0	0
Cozens	4,998	0	0
Wilson	4,995	0	0
Geary	4,890	0	0
Fry	4,844	0	0
Ayers	4,462	0	0
Lancefield	4,425	0	0
Stiff	4,372	0	0
Pollan and Co.	4,166	0	0
Porter	4,162	0	0
Lock and Co.	4,108	0	0
Punnett (accepted)	4,029	0	0

Smith's Work.

Wood	£722	0	0
Geary	647	0	0
Porter	499	0	0
Weir	486	0	0
Pollock	485	0	0
Lancefield	446	0	0
Mackney	398	0	0
Peel	376	0	0
Lock and Co.	350	0	0
Drury and Co. (accepted)	350	0	0

Tenders for St. Mark's new church, Regent's-park. Mr. Little, architect. Quantities furnished:—

Dove	£8,675	0	0
Pollock and M'Lennen	8,026	0	0
T. Burton	8,000	0	0
Locke and Nesham	7,779	0	0
Batterbury	7,604	0	0
W. Higgs	7,379	0	0
Piper	6,892	0	0
Rigby	6,714	0	0
I'Anson	6,650	0	0
Myers	6,546	0	0
Holland	6,369	0	0

Tenders for building ten new almshouses at Richmond, with boundary walls, for the trustees of Bishop Duppas's Almshouses. Mr. Little, architect:—

Grimsdell	£2,214	0	0
W. Long (Richmond)	2,135	0	0
Burton	2,016	0	0
Holland	1,998	0	0
Mansfield	1,984	0	0
Sweet (Richmond)	1,917	0	0
Brewer ,,	1,905	8	0
Carless ,,	1,876	0	0
Thos. Long and Son	1,815	0	0

Tenders for building Mr. Wyld's Globe House, Leicester-square. Mr. Abrahams, architect. Quantities furnished:—

Holland	£3,285	0	0
T. Burton	3,281	0	0
Pollock and M'Lennan	3,190	0	0
W. Higgs	3,187	0	0
R. and E. Curtis	2,980	0	0
Myers	2,755	0	0

TO CORRESPONDENTS.

"*Tiling.*"—"W. X." says,—"In an exposed situation, a roof of 'half pitch' has been covered with round-end plain tiles bedded in mortar, but still it is not weather-tight. It is a custom in many parts of the country to lay the tiles upon straw without mortar; some have been bedded in lime and hair, and some in common mortar. The gauge, that is, the tiles, show on the face 4 inches. The builders in the country recommend straw only. Can any of your readers enlighten me upon this subject, as I am anxious to know the best method of laying plain tiles irrespective of cost."

"*Bolton Markets.*"—In reply to two inquirers, the architect to whom the plans were referred has made his report, but we are not yet in possession of the decision of the corporation.

"J. L.," "M.," "C. M.," "G. P.," "W. H.," "W. T." "A Magistrate," "Three Frenchmen," "T. N.," "C. B." (under our mark), "C. B.," Stangate (declined with thanks), "G. G." (shall appear), "E. B.," "J. T." (pray let us have conclusion), "T. H.," "Elias de Derham," "R. B." (has been forwarded), "Mr. F.," "A. and T.," "T. F. and T.," J. R. D.," "H. B.," "G. G. S.," "Liverpool," "Dun Edin" (the answer was to another query, accidentally misplaced), "A. M'F.," "P. W." (shall be attended to), "K.," "Subscriber," Shrewsbury (the number can be had in the part for November, but not singly. We must decline giving an opinion as to the glass), "A Builder" (we described various modes of making concrete floors some time ago, and cannot repeat. The salts in question would be useless), "T. S. R.," "M.P.," "S. C. T.," "W. M. R.," "T. S. R.," "Outline Sketches of Bruges," by E. S. Cole. S. Bell. "The Stones of Venice, by John Ruskin. Smith and Elder.

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ADVERTISEMENTS.

ROYAL POLYTECHNIC INSTITUTION.—Lecture on the Culture and Appliances of Flax, by Thos. Beale Browne, Esq., on Wednesday and Saturday, at Two o'clock.—Lecture on the Preparation and Bleaching of Flax, by J. H. Pepper, Esq.—Lecture on the Chemistry of Ignition and Combustion.——Lecture by Dr. Bachhoffner on Voltaic Electricity, in which will be exhibited Allman's Patent Electric Light.—Lectures on the Music of Wales, by Ellis Roberts, Esq. (Harpist to H.R.H. the Prince of Wales), with Vocal Illustrations by Miss Blanche Younge, R.A. of Music, on Monday, Tuesday, Thursday, and Friday Evenings at Eight, and on Saturday at Three.—The celebrated Juvenile Harpists (the Lockwood Family) will perform Trios, under the direction of Mr. Frederick Chatterton, daily at Four o'clock.—Exhibition of the Oxy-Hydrogen Microscope.—New Series of Dissolving Views, illustrating some of the Royal Residences of Europe.—Admission, 1s.; Schools, half-price.—Open daily from Eleven till Five o'clock, and every evening (except Saturday) from Seven till Half-past Ten.

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